

NOAA BUSINESS REPORT 2002



FOCUSING on RESULTS



U.S. DEPARTMENT OF COMMERCE • NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



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Focusing on Results



*Conrad C. Lautenbacher, Jr.
Under Secretary of
Commerce for
Oceans and Atmosphere*

The National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce is unique among the world's technological and environmental science agencies. We explore the Earth from the depths of its oceans to the outer limits of its atmosphere. NOAA continues to lead in the physical exploration, the basic understanding, and the prudent and effective management of our Nation's resources in the seas and in the skies. Our 12,500 employees focus our \$3.5 billion budget toward understanding and improving the Nation's environmental and economic health and security, and providing real and tangible products and services.

NOAA has established itself as a critical part of our Nation's economic structure: our products and services directly affect the daily lives of all Americans, and have significant economic consequences for our Nation's economy. We continue to strive to make optimal use of our expertise in Earth observations, global climate research, and data and information management to improve our understanding of ecosystems and environmental change. Through our Web site at www.noaa.gov, we provide a wealth of information to schools and students across our Nation, as well as to industry and scientific enterprises.

Stepping Up Our Commitment

In the wake of September 11, 2001, NOAA has stepped up its commitment to serve the Nation. Our law enforcement officers, our pilots and technicians, our meteorologists and mathematicians, and our support staff at all levels have sustained a high gear, to help in security and recovery efforts. We have continued to look at how NOAA can provide even greater service to our Nation. For example, we have adapted NOAA Weather Radio for use in national emergencies, and we have developed air dispersion models. We are proud of NOAA's daily service to the citizenry of our Nation and we will strive to sustain a high level of service with every resource at our command.

Focusing on Organizational Improvement

Many of the innovative approaches reflected in this report resulted from the NOAA Program Review conducted in 2002. As an agency, we realized that NOAA's mission in this new millennium has changed dramatically from when the agency was founded in 1970. The major issues that we face today are cross-cutting issues that affect all of our major Line Offices. To be effective in attacking the problems of the

NOAA continues to lead in the physical exploration, the basic understanding, and the prudent and effective management of America's resources in the seas and in the skies.



The increased commitment of NOAA's 12,500 employees to take on very real environmental and resource management challenges will continue to be a team effort. Photo: Southwest Fisheries Science Center

future, we must build a NOAA that can operate across traditional lines—an agency that encourages and facilitates innovative and integrative programs to solve the challenging problems that are emerging in a changing world.

A major thrust of the Program Review was to focus NOAA's wealth of talent on organizational improvement. This report and other complementary documents, such as NOAA's FY 2004 Budget Request, the NOAA Program

Review Recommendations and the new crosscutting themes and matrix-managed programs that it mandated, and the new NOAA *Strategic Plan for FY 2003 to FY 2008 and Beyond* reflect the great strides that NOAA has made in addressing the tough issues and complex solutions that are necessary for effectiveness and excellence today and tomorrow.

Building a Corporate NOAA

This increased commitment has been and will continue to be a

team effort—an effort that we believe will result in a truly corporate NOAA, prepared to take on the very real environmental and resource management challenges faced by this agency, this Department, and this Nation.

Conrad C. Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Ret.)
Under Secretary of Commerce for
Oceans and Atmosphere

MANAGEMENT IMPROVEMENTS





NOAA Program Review

Building an Effective, Efficient, Unified NOAA



James R. Mahoney, Ph.D.
Assistant Secretary of Commerce
for Oceans and Atmosphere



Scott Gudes, Deputy Under
Secretary of Commerce for
Oceans and Atmosphere

In February 2002, Admiral Lautenbacher called for a bottom-up, fundamental “NOAA Program Review” to examine NOAA’s strengths and opportunities for improvement. The Administrator gave all NOAA employees an opportunity to suggest organizational, resource, and business process changes.

From February through April, a group of 16 NOAA executives representing each Line and Staff Office reviewed and debated issues brought forward by employees. Supported by an outstanding staff, including executive leadership candidates and a contract facilitator, this Program Review Taskforce (PRT) examined a number of areas where NOAA can improve program support for our employees and constituents—from facilities, grants, and requirements; to education and outreach; to alignment of laboratories; to planning and acquiring environmental observing systems. The PRT recommended both

immediate and long-term changes to build a more effective, efficient, and unified NOAA.

NEW PRIORITIES FOR THE 21ST CENTURY

The PRT report presented a vision for NOAA’s future missions that will draw on the agency’s core strengths in observations, prediction, and stewardship to tackle the inherently complex problems of tomorrow. Achieving our goals will require that NOAA move beyond its traditional “stove-pipe” structure, increase teamwork, and develop cohesive, cross-NOAA programs that contribute to a “corporate” NOAA. The PRT recommended organizational changes that will include Line Office realignment

over the next several years; comprehensive planning, programming, and budgeting processes linked to a “rolling horizon” strategic plan; and a NOAA-wide requirements process to ensure that new and existing programs are fully reviewed and properly executed.

The 21st century poses complex challenges for NOAA. Every aspect of NOAA’s mission—ranging from managing coastal and marine resources to predicting changes in the Earth’s environment—faces a new urgency, given intensifying national needs related to the economy, the environment, and public safety. As the new century unfolds, new

priorities for NOAA action are emerging in the areas of climate change, fresh-water supply, ecosystem management, and homeland security.

NOAA’s new Strategic Plan responds to these challenges for the next five years and beyond, setting the framework to build NOAA’s capacity to address new priorities and realize its vision and mission. It forges a path for meeting the needs of America today and addressing the critical issues of tomorrow. It responds to the President’s Management Agenda for a citizen-centered, performance-driven organization that serves every American every day.

NOAA’s Mission Goals

NOAA’s new Strategic Plan results from consultations with more than a thousand stakeholders and NOAA employees across the Nation to identify present and future environmental, economic, and public safety issues. Based on their input, the Plan sets an agenda for wise investment of finite resources through four overarching goals for achieving NOAA’s mission:

- Protect, restore, and manage the use of coastal and ocean resources through ecosystem management approaches.
- Understand climate variability and change to enhance society’s ability to plan and respond.
- Serve society’s needs for weather and water information.



- Support the Nation's commerce with information for safe and efficient transportation.

NOAA's Crosscutting Priorities

In an effort to build specific core strengths, NOAA selected six core capabilities that it recognized as essential to support its mission goals. In FY 2002, NOAA stakeholders and employees felt strongly that NOAA needed to increase its priority on further improving NOAA's core capabilities that support all of NOAA's mission goals. As a result, NOAA is establishing the following six crosscutting priorities for the 21st century:

- Integrated Global Environment Observation and Data Management System.
- Environmental Literacy, Outreach, and Education.
- Sound, Reliable, State-of-the-Art Research.
- International Cooperation and Collaboration.

- Homeland Security.
- Organizational Excellence: Facilities, Infrastructure, Security, Human Capital, and Administrative Services.

Improved NOAA Grants Processes

The Acquisition and Grants Office (AGO) has embarked on an end-to-end Grants Process Improvement initiative. This initiative is based on the PRT recommendations and involves every administrative and programmatic aspect of the NOAA grants process.

NOAA has established cycle time goals for grant-processing activities in the Line Offices, the NOAA Budget Office, and the AGO to reduce the average processing time for competitive grant programs from seven months to five months. A number of process changes are being implemented to achieve these goals, including earlier publication of competitive *Federal Register* notices, streamlined alloca-

As the new century unfolds, new priorities for NOAA action are emerging in the areas of climate change, fresh-water supply, ecosystem management, and homeland security. Photo: Joni Packard, NOAA Fisheries



In April 2002, James R. Mahoney (left) was sworn in as Assistant Secretary of Commerce for Oceans and Atmosphere, and Timothy R.E. Keeney was sworn in as Deputy Assistant Secretary of Commerce in the White House Liaison Office.



NOAA's new Strategic Plan responds to the President's Management Agenda for a citizen-centered, performance-driven organization that serves every American every day. Photo: Jim McCallum, NOAA Fisheries

tion of funds, posting grant program application kits on one central Web site for ease of review by potential applicants, and streamlined merit review procedures.

Cycle time goals are also being established for noncompetitive grant programs to effect a similar

reduction in total processing time. In addition, NOAA has simplified Office of General Counsel reviews for several major grant programs and continues to pursue simplification for our other programs.

Improvements under development include electronic applications for

the grantees and a series of "quick wins" enhancements to the internal grant-processing software. The quick wins enhancements will improve the existing NOAA Grants System until a fully operational Grants On-Line system is available, which is anticipated in FY 2004.

NOAA'S VISION

To move NOAA into the 21st century scientifically and operationally, in the same interrelated manner as the environment that we observe and forecast, while recognizing the link between our global economy and our planet's environment.

NOAA'S MISSION

To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet the Nation's economic, social, and environmental needs.

NOAA'S CORE VALUES

People, Integrity, Excellence, Teamwork, Ingenuity, Science, Service, Stewardship

BENEFITS TO THE NATION

Consistent with its results-oriented approach to strategic planning, NOAA is committed to maximizing the benefits of its products and services in terms of improvements to our Nation's environment, public safety, and economy.

Administrator's Metrics

Using Solid Data to Measure Success

The Strategic Plan will guide all of NOAA's management decisions and will provide a consistent, coherent framework for Line Office and cross-organizational plans, initiatives, and performance measures for the next decade. Ultimately, our success will be measured in the quality of service and benefits we provide to our customers—the American public.

In addition to the performance data collected and published specifically to support the President's Management Agenda and the budget process, NOAA's Line and Staff Offices have begun reporting other operational measures to the NOAA Administrator during the Quarterly Performance Reviews. Known collectively as the "Administrator's Metrics," these data sets reflect NOAA's commitment to "management by fact." This section presents samples of these reports from the quarterly reviews for each Line and Staff Office.

NATIONAL OCEAN SERVICE

NOAA is responsible for mapping the Nation's 95,000 nautical miles of coastline. The Hydrographic Services Improvement Act of 1998 authorizes NOAA to promulgate national standards for all information acquired for nautical charting purposes. With the growing use of

electronic navigational systems and the integration of electronic navigational charts into those systems, accurate shoreline information is an increasingly pressing need. Nautical charting also serves as the baseline for all marine boundary applications, such as determining America's marine territorial limits, including the Exclusive Economic Zone.

SHORELINE MAPPING GOALS

Outcome/Goal

Provide accurate, consistent shoreline data for 95,000 nautical miles (nm) of U.S. coastline.

Performance Metric

Establish a 5-year cycle for shoreline mapping in the Nation's critical port areas, and a 10-year cycle for shoreline mapping outside the critical port areas.

Survey Areas	Nautical Miles	Cycle	Annual Goal	% of Overall Goal
40 Major Ports	8,000 nm	5 years	1,600 nm	20%
Coastal Areas	54,000 nm	10 years	5,400 nm	10%
Alaska	33,000nm	10 years	3,300 nm	10%



Each year, NOAA assesses the status of fisheries, reporting on the number of commercially and recreationally important stocks that need rebuilding. Photo: William L. High, NOAA Fisheries

NATIONAL MARINE FISHERIES SERVICE

The *2000 Report to Congress on the Status of U.S. Fisheries* classified 82 stocks that need to be rebuilt to levels that support maximum sustainable yield. The rebuilding process, which typically takes many years, depends on both fishery management measures and the effects of natural influences (and other sources of mortality) that affect the reproductive success of the stocks. As of 2002, the number of major stocks needing rebuilding decreased to 45, as a result of the successful rebuilding of Gulf of Mexico king mackerel. Each year additional new stocks may be classified as overfished, but for the purpose of tracking continuity, this metric follows only the stocks from year 2000.

REBUILDING OF FY 2000 OVERFISHED STOCKS

Metrics	FY 2000	FY 2001	FY 2002
Major Stocks	46	46	45
Not Fully Rebuilt			
Minor Stocks	36	36	36
Not Fully Rebuilt			
TOTAL	82	82	81

OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

For over 30 years, NOAA Sea Grant's long-term investment in research and development for marine aquaculture has resulted in an estimated value of more than \$100 million annually. In 1998, Sea Grant began investing in new technologies (e.g., offshore submerged cages and recirculating systems) that have significantly increased industry production in a short period of time and are promising areas for future investments.

INDUSTRY VALUE OF PROMISING NEW METHODS TO COMMERCIAL AQUACULTURE (in millions)

FY 2000	\$0.25
FY 2001	\$0.50
FY 2002	\$1.00
FY 2003	\$2.00
FY 2004	\$4.00

Note: Totals are derived from the sum of industry values of individual species production for which NOAA Sea Grant has made investments.

NATIONAL WEATHER SERVICE

Between 1987 and 1995, tornado lead time increased from less than 4 minutes to more 10 minutes. Improvement between 1993 and 1995 were attributed to deployment of Nation's Next-Generation Radar (NEXRAD), a tri-agency program of the National Weather Service, the Federal Aviation Administration, and the U.S. Air Force. Since 1995, tornado lead time has remained at a steady state, around 10 minutes. Outyear

TORNADO LEAD TIME (in minutes)

Fiscal Year	Actual	# Events
1987	3.4	667
1988	4.0	661
1989	5.4	1,009
1990	7.2	1,261
1991	5.9	1,262
1992	7.3	1,189
1993	6.0	1,421
1994	7.7	1,128
1995	9.9	1,244
1996	9.9	1,269
1997	9.3	1,176
1998	10.9	1,544
1999	11.6	1,603
2000	9.8	1,045
2001	10.0	1,205
2002	11.4	725

improvements depend on planned retrofits to NEXRAD hardware; continued emphasis on training, including use of the Weather Event Simulator; and implementation of best practices procedures in field offices. The National Weather Service's Government Performance Results Act goal for FY 2007 is 15 minutes.

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE

Currently, about 85 percent of the data used to initialize numerical weather prediction (NWP) models comes from satellites. The next few years will experience an explosive growth in the number of satellite instruments capable of further improving NWP accuracy. Additionally, the development of powerful mathematical techniques to assimilate the data into NWP models provides further opportunities to improve the accuracy and extend the time range of weather and climate forecasts.

SATELLITE DATA DAILY AVERAGES AND SUCCESSFUL DELIVERY

Metrics	FY 2000	FY 2001	FY 2002
Gigabytes Received	77.59	104.42	128.57
% Successful Delivery	99.25	99.49	99.23
Millions of Dollars	\$15.8	\$15.5	\$19.6



With the growing use of electronic navigational systems and the integration of electronic navigational charts into those systems, accurate shoreline and bathymetric information is an increasingly pressing need.

NOAA MARINE AND AVIATION OPERATIONS

NOAA Marine and Aviation Operations' (NMAO's) primary customers are the NOAA programs and Line Offices who use our platforms to support their missions. NMAO solicits feedback from its customers about their level of satisfaction with ship and aircraft operations, including the quality of personnel support and equipment on board. In 2002, NMAO also solicited feedback from customers about the fleet allocation process, which assigns ship and aircraft time to projects based on project needs and platform availability. Customers were asked to fill out survey forms on the fleet allocation process and ship or aircraft opera-

tions and return them to NMAO. Customer Satisfaction was rated on a scale of 1 to 4.

RESULTS OF FY 2002 NMAO CUSTOMER SURVEY ON FLEET OPERATIONS

Customer Satisfaction with Ship Support	3.42
Customer Satisfaction with Aircraft Support	3.89

1 = Poor/Failed to Complete Objectives; 2 = Fair/Did Not Meet Expectations; 3 = Good/Met Expectations; 4 = Exceeded Expectations

NOAA FINANCE AND ADMINISTRATION

During FY 2002, the grants award process was improved. The overall average processing time within Line Offices on competitive programs

was 144 business days (approximately 7 months) from date of *Federal Register* notice publication until submission of packages to the Grants Management Division. The FY 2003 goal for average processing time within Line Offices on competitive program will be 108 business days (approximately 5 months).

PROCESSING TIME FOR NOAA COMPETITIVE GRANT PROGRAMS

Metrics	FY 2002	FY 2003
# of Business Days	144	108
# of Months	7	5

NOAA HIGHLIGHTS





Excellence in NOAA Leadership



President George W. Bush and National Weather Service Deputy Assistant Administrator John Jones at NOAA's Silver Spring Metro Center Complex.
Photo: Ronald Bell, U.S. Department of Commerce

PRESIDENTIAL RANK AWARDS



Dr. James Balsiger, Regional Administrator, NOAA Fisheries Alaska Region

Dr. Eddie N. Bernard, Director, Pacific Marine Environmental Laboratory, NOAA Research

Dr. Stephen B. Brandt, Director, Great Lakes Environmental Research Laboratory, NOAA Research

Gary K. Davis, Director, Office of Systems Development, National Environmental Satellite, Data and Information Service

Dr. David J. Hofmann, Director, Climate Monitoring and Diagnostics Laboratory, NOAA Research

Dr. James E. Hoke, Chief, National Centers for Environmental Protection, Meteorological Division, National Weather Service

Dr. Edward R. Johnson, Director, Strategic Planning and Policy Office, National Weather Service

Dr. Thomas R. Karl, Director, National Climatic Data Center, National Environmental Satellite, Data and Information Service

Brig. Gen. Jack Kelly, Assistant Administrator, National Weather Service

Louisa Koch, Acting Assistant Administrator, NOAA Research

Gregory W. Withee, Assistant Administrator, National Environmental Satellite, Data and Information Service

2001 KEY EVENTS

OCTOBER 1—During a waterfront celebration event in Charleston, South Carolina, NOAA marked the successful completion of two ground-breaking ocean exploration missions and honored U.S. Senator Ernest F. Hollings for his support of ocean science.

OCTOBER 17—NOAA targeted \$2.5 million to the University of Maryland Eastern Shore (UMES), in Princess Anne, Maryland, as the lead institution in establishing a Living Marine Cooperative Science Center. The award is part of NOAA's new Educational Partnership Program with minority-serving institutions.

OCTOBER 19—Chris Brothers, a teacher at Falmouth High School in Massachusetts participated in the Teacher at Sea program. Brothers went aboard the NOAA fisheries research ship *Miller Freeman* for 11 days to help conduct a pollock fishery stock assessment survey and to study Stellar sea lion interactions.

OCTOBER 24—NOAA's National Climatic Data Center in Asheville, North Carolina, unveiled two new indices that evaluate the effects of climate conditions on corn and soybean yields and on residential energy needs.

NOVEMBER 4—At the NOAA Radar Operations Center in Norman,

Oklahoma, the Next-Generation Weather Radar (NEXRAD) troubleshooters celebrated 10 years of providing technical and scientific support to the worldwide network of Doppler weather radar.

NOVEMBER 7—NOAA Fisheries funded nearly \$1 million in projects to help communities restore coastal and marine habitats, benefiting our nation's fisheries. This is the first series of projects NOAA Fisheries and the American Sportfishing Association's Fish America Foundation will fund under a new three-year partnership agreement.

NOVEMBER 15—Using NOAA-operated satellites, NOAA's National Ice Center in Suitland, Maryland, detected the

DEPARTMENT OF COMMERCE AWARDS

Gold and Silver Medals

Nearly 60 NOAA individuals and groups received the Department of Commerce Gold and Silver Medals. These awards annually recognize extraordinary achievements that support the Department's mission. The Secretary awards the Gold Medal, the Commerce Department's highest honorary award, for distinguished performance characterized by extraordinary, notable, or prestigious contributions to the Commerce Department and/or one of its operating units

Bronze Medal

The Under Secretary awarded the Department's Bronze Medal to 192 NOAA employees and 16 NOAA organizations. This medal is the highest form of honorary recognition for superior service to NOAA and the Department of Commerce.



NOAA ADMINISTRATOR AWARDS

More than 150 individuals and groups received the following NOAA Awards during a ceremony held May 10, 2002:

- Administrator Awards, recognizing excellence in teamwork;
- Diversity Spectrum Awards, recognizing employees who have made a special effort to enhance the NOAA workplace;
- Best Practices Award, recognizing managerial excellence;
- Technology Transfer Awards, recognizing innovation;
- Environmental Hero Awards, recognizing some of NOAA's external partners; and
- NOAA employee and Team Member of the Month Awards, recognizing people who enable NOAA to function efficiently and effectively every day.



calving (or splintering) of a new, 233-square-mile iceberg ("B-21") from the Pine Island Glacier in Antarctica's Amundsen Sea.

DECEMBER 5—A U.S. Coast Guard Administrative Law Judge assessed a \$250,000 fine against the fishing vessel *Independence*, owned by Lobsters, Inc., for repeatedly entering an area closed to fishing. This ruling was the first Federal fisheries prosecution based exclusively on vessel-tracking data gathered by the satellite-based Vessel Monitoring System.

DECEMBER 11—After nearly a year in the Pacific Ocean studying climate systems, probing submarine volcanoes, and exploring the deep Astoria Canyon

off the Oregon coast, the NOAA research vessel *Ronald H. Brown* returned to its home port in Charleston, South Carolina.

2002 KEY EVENTS

JANUARY 2—NOAA awarded \$31,757 to ChannelKeeper, to facilitate its community-based eelgrass restoration project in California's Channel Islands.

JANUARY 2—NOAA Fisheries' Community-Based Restoration Program awarded \$70,000 for two community-level restoration projects designed to improve and restore northern California coastal stream

habitats important to salmon, steelhead, and coastal cutthroat trout.

JANUARY 4—The Court of International Trade ruled in favor of NOAA Fisheries by dismissing a lawsuit brought by the Defenders of Wildlife over implementation of its dolphin conservation program in the eastern tropical Pacific Ocean tuna fishery.

JANUARY 6—Six fishermen were rescued and airlifted by Coast Guard search-and-rescue teams 50 miles off the coast of North Carolina, after environmental satellites operated by NOAA and the Russian government detected a distress signal from the fishing vessel *Mediterranean Sea II*.

Key Congressional Hearing Highlights

NOAA's FY 2003 Budget Requirements

On March 19, 2002, in testimony before the Senate Appropriations Committee, Admiral Lautenbacher, stated: "We are an agency that deals with environmental change. We are an agency whose products form a critical part of the daily decisions

made by Americans across the Nation and affect our economy and gross domestic product. From our climate predictions that impact farming and financial deci-



*Mary Beth Nethercutt,
Director of
Legislative Affairs*

sions to our hydrological products that affect public utilities and energy consumption, NOAA is a critical part of our Nation's economic security."

Coral Reefs

On June 27, 2002, Timothy R.E. Keeney made the following statement before the House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans: "Conserving coral reefs is an important and major task, requiring coordinated effort from a variety of Federal agencies, states and territories, other nations, and nongovernmental

organizations. The National Action Plan provides an excellent blueprint for U.S. action to conserve coral reefs. We must continually evaluate this blueprint and make changes to reflect current coral reef trends as well as new science."

Science Research Program

On July 11, 2002, Dr. James R. Mahoney, Assistant Secretary for Oceans and Atmosphere, testified before the Senate Commerce, Science, and Transportation Committee: "The status of the entire Earth system, including the potential impacts of climate and ecosystem variability, is a capstone issue for our generation and will continue to be so for our children. The Administration fully embraces the need to provide the best possible scientific basis for understanding the complex interactions that determine

JANUARY 10—Research divers from NOAA's Laboratory in Beaufort, North Carolina, observed an Indo-Pacific species of lionfish near two shipwrecks off the North Carolina coast. The lionfish is not native to the southeastern United States, and its venomous spines are dangerous to humans and other fish.

JANUARY 14—The NOAA Cooperative Remote-Sensing Science and Technology Center officially opened during a ceremony at The City College of the City University of New York. The center received \$2.5 million and is expected to receive another \$5 million over the next two years.

JANUARY 14—The National Weather Service forecast office in Salt Lake City served as the official Weather Operations Center for the 2002 Olympic Winter Games.

JANUARY 22-25—International experts in coral reef diseases and biomedical science met in Charleston, South Carolina, to develop a national research plan for corals.

FEBRUARY 7—NOAA's National Ice Center discovered an iceberg newly calved from the Matusevich Glacier Tongue, a large extension of the Matusevich Glacier from the Antarctic mainland into the northwestern Ross Sea.

FEBRUARY 20—NOAA and colleagues in Australia reported that corals are bleaching over extensive portions of Australia's Great Barrier Reef, a sign that the reef is being seriously stressed during current record-breaking warm water conditions.

FEBRUARY 24—Environmental satellites operated by NOAA and the Russian government detected a distress signal from a vessel off the coast of St. Croix, U.S. Virgin Islands. The vessel had sunk and its crew were adrift in a life raft when a Navy helicopter from Naval Station Roosevelt Roads, Puerto Rico, rescued them.

MARCH 1-2—The National Weather Service held the National Severe Weather Workshop in Norman, Oklahoma.

MARCH 6—NOAA Fisheries' Office for Law Enforcement provided \$100,000 to the State of Oregon's Police, Fish, and Wildlife Division and \$900,000 to the State of Washington's Department of Fish and Wildlife to increase enforcement of fisheries regulations at sea, dockside, and on land over the next three years.

MARCH 7—David M. Anderson, of NOAA's Paleoclimatology Program, and David Archer of the University of Chicago developed a new method to determine the carbonate ion concentration of seawater, using shells on the ocean floor deposited over thousands of years.

MARCH 13—NOAA extended the Federal ban on shark finning to the Pacific Ocean, prohibiting Federally regulated fishing vessels from carrying or landing shark fins without the entire shark carcass.

MARCH 22—The National Space Club honored the Nation's polar-orbiting operational environmental satellite program for its outstanding contributions to the field of space and its extraordinary

the constantly changing nature of our Earth's life systems.”

Coastal America

On October 3, 2002, Scott Gudes, Under Secretary for Oceans and Atmosphere, testified before the House Fisheries Conservation, Wildlife, and Ocean Resources Subcommittees: “Our Nation’s coastal resources face myriad challenges, such as habitat destruction, polluted runoff, and coastal hazards. Coastal America serves as a catalyst for interagency partnerships to address these challenges and mitigate their efforts at the local, regional, and national levels. The Coastal American Partnership is an excellent example of government and private-sector collaboration and coordination.”



success, over four decades, with the polar-orbiting spacecraft known as TIROS.

APRIL 15–24—An all-female science team conducted the year’s first mission of NOAA’s Aquarius. Located in NOAA’s Florida Keys National Marine Sanctuary and operated by the University of North Carolina at Wilmington, the underwater ocean laboratory is the Nation’s only “inner space” station.

APRIL 17—The Rapid Update Cycle (RUC20) model developed at NOAA’s Forecast Systems Laboratory in Boulder, Colorado, was implemented at the National Centers for Environmental Prediction in Camp Springs, Maryland.

MAY 10—NOAA Fisheries and Sea Grant awarded fellowships to four doctorate-level graduate students to pursue their studies in population dynamics and marine resource economics: Thomas Ihde of the College of William and Mary, Virginia Institute of Marine Science; Melissa Haltuch of the University of Washington, Seattle;

Yasmin Lucero of the University of California at Santa Cruz; and Stephanie Wood of the University of Massachusetts at Boston.

MAY 10—The United States agreed to lend Japan the Geostationary Operational Environmental Satellite, GOES-9, to ensure continuous geostationary meteorological coverage in the western Pacific, including U.S. territories, U.S. military facilities, and U.S. military and commercial vessels in the region.

MAY 30—The National Weather Service honored the Quinault Indian Tribe as the first Native American community in the country to receive the “TsunamiReady” designation.

JUNE 11—NOAA received \$600,000 in new U.S. funding in support of its *Second Report on the Adequacy of the Global Climate Observing System*. President Bush’s Clear Skies and Global Climate Change Initiatives announced in February call for the United States to provide funding for high-priority areas of climate change science over the next five years.

JUNE 14—NOAA dedicated a survey marker at the headquarters of the United States Power Squadrons in Raleigh, North Carolina, in a ceremony that recognized the squadrons’ 39 years of volunteer service to update the Nation’s official nautical charts.

JUNE 14—Crews battling the Colorado wildfires received help from NOAA satellites flying some 23,000 miles above the equator and from specially trained incident meteorologists who joined the teams near the front lines of the blaze battle.

JUNE 18—Through a partnership between NOAA and the University of Michigan, the research vessel *LAURENTIAN* was transferred to NOAA’s Great Lakes Environmental Research Laboratory on Lake Michigan, where it will serve as the laboratory’s primary research vessel.

JUNE 24—The environmental satellite NOAA-M lifted off from an Air Force Titan II vehicle at California’s Vandenberg Air Force Base. The launch was witnessed by NOAA Administrator Lautenbacher and NASA

KEY CONGRESSIONAL HEARINGS—FY 2002

Date	Committees and Agencies	Subject	NOAA Witnesses
January 24	Senate Committee	Confirmation hearing	Dr. James Mahoney, Assistant Secretary for Oceans and Atmosphere
February 14	House Transportation and Infrastructure Water Resources and Environment Subcommittee	FY 2003 NOAA budget request for protecting and restoring coastal and marine resources	Margaret Davidson, Acting Assistant Administrator, National Ocean Service
February 28	House Science Committee, Subcommittee on Environment, Technology, and Standards	National Sea Grant reauthorization legislation and the proposal to transfer the Sea Grant program to the National Science Foundation	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
March 7	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	The oceans and fisheries portion of the FY 2003 NOAA budget request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
March 13	House Resources Committee	National Academy of Sciences report on endangered and threatened fishes in the Klamath River Basin	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
March 14	House Armed Services Military Readiness Subcommittee	Environmental and encroachment issues	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
March 14	House Appropriations Committee; Departments of Commerce, Justice, and State; the judiciary, and related agencies	FY 2003 NOAA budget request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
March 19	Senate Appropriations Committee; Departments of Commerce, Justice, and State; the judiciary, and related agencies	FY 2003 NOAA budget request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
March 20	House Resources Committee	Endangered Species Act legislation	Rebecca Lent, Deputy Assistant Administrator for Regulatory Programs, NOAA Fisheries
May 1	Senate Commerce, Science, and Transportation Committee	FY 2003 NOAA budget request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
May 2	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Reauthorization of the Magnuson–Stevens Fishery Management Act	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
May 9	Senate Commerce Oceans, Atmosphere, and Fisheries Subcommittee	Management of NOAA Fisheries	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
May 14	Senate Commerce Oceans, Atmosphere, and Fisheries Subcommittee	Pacific Salmon Recovery Act (S. 1825)	Don Knowles, Director, Protected Resources, NOAA Fisheries
May 15	House Transportation and Infrastructure Water Resources and Environment Subcommittee	Implementation of the National Invasive Species Act	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere

Administrator O’Keefe—the first time in history that the leaders of these two agencies have witnessed a launch together.

JULY 9—Partly initiated by the NOAA-funded Atmospheric Investigation, Regional Modeling, Analysis and Prediction project, the July-to-August New England Air Quality Study involved approximately 100 NOAA personnel and more than 20 partner institutions. Data were collected by instruments aboard the *RONALD H. BROWN* and by a G-1 Gulfstream research aircraft operated by the U.S. Department of Energy’s Pacific Northwest National

Laboratory. Senator Judd Gregg visited the ship while it was in Portsmouth, New Hampshire.

JULY 30—A panel of NOAA senior scientists mapped out the path for the most sophisticated and comprehensive knowledge about U.S. marine fish stocks to date.

AUGUST 5—NOAA raised two large Dahlgren cannons and the world’s first armored revolving gun turret from the wreck of the Civil War ironclad *USS Monitor*, which rests in the “Graveyard of the Atlantic” 16 miles southeast of Cape Hatteras, North Carolina. The turret was transported to Newport

News, Virginia, where The Mariners’ Museum’s conservators will begin a 10-year process to preserve it. Senator John Warner attended a ceremony in honor of this effort.

AUGUST 6—NOAA unveiled a major new public–private partnership that will bolster the government’s ability to respond to a homeland security incident involving airborne hazardous materials.

AUGUST 23—NOAA, the Department of Defense, and the National Aeronautics and Space Administration awarded a \$4.5 billion contract to TRW, Inc., to build and deploy the Nation’s future

Date	Committees and Agencies	Subject	NOAA Witnesses
May 16	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Draft authorizing legislation for many of NOAA's ocean and coastal programs	Scott Gudes, Deputy Under Secretary for Oceans and Atmosphere
May 23	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Marine Protected Areas	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
June 13	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Reauthorization of the Marine Mammal Protection Act	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
June 19	House Resources Committee	Short-nosed sturgeon and the Washington Aqueduct	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
June 19	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Reauthorization of the Endangered Species Act	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
June 27	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Implementation of the Coral Reef Conservation Act and climate change as it affects corals	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere, and Alan Strong, Marine Applications Science Team Coral Reef Watch Project Coordinator
July 10	House Science Committee	Administration's scientific research program on global climate change	Dr. James Mahoney, Assistant Secretary for Oceans and Atmosphere
July 11	Senate Commerce Committee	Administration's scientific research program on global climate change	Dr. James Mahoney, Assistant Secretary for Oceans and Atmosphere
July 24	House Science Committee, Subcommittee on Environment, Technology, and Standards	Satellite data management at NOAA	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
July 25	House Energy and Commerce Oversight and Investigations Subcommittee	National Climate Assessment	Thomas Karl, Director, National Climate Data Center
August 5	Senate Committee on Environment and Public Works	"The Dead Zone in Lake Erie: Past, Present and Future"	Dr. Jeffery M. Reutter, Director, Ohio Sea Grant College Program
September 17	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	International Trade to Endangered Species (CITES)	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
September 26	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	H. Con. Res. 427, regarding white marlin-related trade sanctions	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
October 3	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Coastal America and the transfer of the NOAA Fisheries Tiburon Lab to San Francisco State University	Scott Gudes, Deputy Under Secretary for Oceans and Atmosphere
November 14	House Resources Committee, Subcommittee on Fisheries Conservation, Wildlife, and Oceans; and House Science Committee, Subcommittee on Environment, Technology, and Standards	H.R. 5395 and H.R. 5396, Non-indigenous Aquatic Nuisance Prevention and Control Act	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere

environmental satellite system.

AUGUST 28—At the World Summit for Sustainable Development in Johannesburg, South Africa, Admiral Lautenbacher announced the "White Water to Blue Water" initiative, which outlined the direct relationship between the use of land and fresh-water resources and the health of ocean and coastal resources.

SEPTEMBER 12—NOAA met with private and academic weather and data experts to plan the modernization of the Nation's volunteer network of more than 11,000 weather observers whose daily data reports are used by the

National Weather Service to forecast changes in our weather, water, and climate.

SEPTEMBER 24—NOAA's Cooperative Institute for Climate and Ocean Research awarded a \$4.6 million grant to support the Woods Hole Oceanographic Institution's core projects in coastal ocean research, the role of the ocean in climate, and analysis of marine ecosystems.

NOVEMBER 17-23—Admiral Lautenbacher met with senior leaders from New Zealand and Australia to discuss enhanced cooperation on ocean- and climate-related issues in the Southern

Hemisphere. Admiral Lautenbacher is the first NOAA Administrator to visit these two countries. As result of this visit, Australia will fund 45 Argo floats, worth more than a million U.S. dollars, for deployment in the southern Pacific Ocean.

OPERATIONS, PRODUCTS, AND SERVICES

From scuba divers to supertanker captains, NOAA supports the needs of a broad spectrum of coastal interests, including mariners and port authorities; commercial and recreational fishers; resource managers and marine scientists; Federal, state, and local governments; international and non-governmental organizations; and the millions of Americans who live and recreate on the coasts. Through NOAA and its academic partners, thousands of scientists, engineers, technicians, and graduate students participate in furthering our knowledge of natural phenomena that affect all of our lives.

NOAA's products and services include short-term weather forecasts, seasonal climate predictions, long-term global change prognoses, environmental technologies, nautical charts, marine fisheries statistics and regulations, assessments of environmental changes, hazardous materials response information, and stewardship of the Nation's ocean, coastal, and living marine resources.





National Ocean Service

Managing and Conserving Coastal Resources



Jamison Hawkins, Acting Assistant Administrator

Coastal regions make up less than 10 percent of the Nation's land mass, yet are home to more than half of our population. They include some of our most biologically important and environmentally sensitive habitats. More than 98 percent of the Nation's trade moves through U.S. coastal ports, and waterborne commerce is expected to double in the next 20 years.

As the Nation's coastal steward, the National Ocean Service (NOS) balances environmental protection with economic development by providing the scientific, technical, and management expertise necessary to address the complex challenges of our coastal regions. NOS' major focus is to manage and conserve coastal resources for the use and benefit of today's and tomorrow's generations.

ACCOMPLISHMENTS

Navigation and Commerce

Navigation Tools Ensure Safe Journey

NOS' suite of navigation information services helped to ensure the safe journey of the freighter *Zhen Hua 1* to Oakland, California. Carrying four cranes standing 22 stories high, the freighter passed under the San Francisco–Oakland Bay Bridge with approximately two feet to spare. The ship's captain consulted NOS' real-time water levels to determine actual water depths at transit time, used the National Spatial Reference System to determine the air gap between the tops of the cranes and the bottom of the bridge's span, and

consulted NOS' nautical charts to identify normal water depths and obstructions.

Sailors Race with Confidence

Volvo sailboat racers breezed out of Annapolis, Maryland, at the restart of the Volvo Race last spring as easily as they breezed in. The sailboats'

captains used NOS' experimental current and tide predictions and wind analysis to navigate Chesapeake Bay on leg six of the race. The experimental numerical model of Chesapeake Bay produced maps of the speed and direction of the bay's currents. The model may one day provide an on-line replacement for the tide and current tables used by mariners.

Great Lakes Water-Level Network Upgraded

A recent upgrade of the National Water Level Observation Network (NWLON) in the Great Lakes is providing up-to-the-minute Internet and telephone access to all Great Lakes water-level gauges. The upgrade added two new water-level gauges, bringing the total number of stations in the network to 51. NWLON supports the marine

NOS' suite of navigation information services helped to ensure the safe journey of the freighter Zhen Hua 1 to Oakland, California. Carrying four cranes standing 22 stories high, the freighter passed under the San Francisco–Oakland Bay Bridge with approximately two feet to spare. Photo: 111th Aerial Photography Squadron





transportation system, coastal managers, the scientific community, and others by providing both real-time observations and a long-term record of water levels, relevant to climate change and sea-level trends—critical for safe navigation and storm surge warnings.

Commemorative Markers Serve Spatial Reference System

In cooperation with its partners, NOS set and accurately positioned several permanent commemorative brass monuments that also serve as geodetic control points for spatial reference. The new markers include one in Salt Lake City, Utah, commemorating the 2002 Winter Olympics. Other markers denote centers of U.S. population based on 2000 census data in Edgar Springs, Missouri; Maryland; New Jersey; and Washington. The geographic coordinates of each location were determined to an accuracy of two centimeters through Global Positioning System observations.

PORTS® Dedicated in Alaska and Chesapeake Bay

NOS dedicated two new PORTS®—in Chesapeake Bay and Anchorage, Alaska—bringing the total number of PORTS® to nine. The centralized Physical Oceanographic Real-Time System (PORTS®) helps mariners avoid groundings and collisions in bays and harbors by providing accurate, up-to-the-minute information on water levels, currents, salinity, and other oceanographic and meteorological data.

Thousands of Miles of Coast Mapped

NOS is responsible for surveying U.S. coastal regions and navigable waters, and for providing the Nation with up-to-date nautical charts. This past year, a large portion of NOS shoreline mapping occurred on the Gulf coast, the Northwest Hawaiian Islands, and Southeast Alaska. The ports surveyed included Belmont, Baton Rouge, Lake Charles, and Morgan City, Louisiana; Beaumont,

NOS dedicated two new PORTS®—in Chesapeake Bay and Anchorage, Alaska—bringing the total number of PORTS® to nine.

Orange, and Port Arthur, Texas; and Jacksonville, Florida. NOS mapped the shoreline in 17 coastal areas, including: the Gulf Intercoastal Waterway from New Orleans to Galveston; Aialik Bay, Kasaan Bay, and Icy Bay, Alaska; and Necker Island, French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes, Midway Island, Kure Island, Kiihau Island, and the Gardner Pinnacles in the Northwest Hawaiian Islands.

Navigation Products Available on Net

NOS placed provisional electronic navigational charts (ENCs) on the Internet for the public's evaluation. Downloads of the ENCs have exceeded 1/4 million. Historical maps and charts, the coastal maps series, and vector shoreline are also available. More than 20,000 images of charts and maps from the early 1800s up to the 1990s make up the



NOS' Airport Survey Program supports a wide range of national airspace system activities, including information about latitude, longitude, height, navigational aids, obstructions, and orientation for airport runways and taxiways.

Nation's largest digital repository of historical nautical charts, including an extensive Civil War collection, topographic series, city plans, and bathymetric maps. The coastal map series is produced directly from current editions of NOS' nautical charts with navigational symbols removed—leaving only basic topographical and hydrographic data. The vector shoreline project provides access to current coastline data extracted from NOS charts.

Survey Program Enhances Flight Safety

NOS is responsible for providing the Federal Aviation Administration with information needed for safe air transportation. NOS' Airport Survey Program supports a wide range of national airspace system activities, including information about latitude, longitude, height, navigational aids, obstructions, and orientation for airport runways and taxiways. In FY 2002, NOS conducted 805 surveys, which included obstruction charts and geographic information

systems of airport movement areas. The program also supports future engineering projects, such as construction of runways and taxiways, establishment of aids to navigation, and clearing of obstructions.

Surveys Support Homeland Security and Safe Navigation

Safe navigation through U.S. ports and waterways depends upon highly accurate nautical charts and updates to chart data, particularly for vessels carrying petroleum or other hazardous materials. In cooperation with the U.S. Navy and the U.S. Coast Guard, NOS altered its planned 2001–2002 hydrographic survey schedule after September 11, 2001, in order to survey a number of critical ports and harbor approaches. The updates will help protect military and commercial ship routes from potential accidents and possible terrorist strikes.

Habitat

Gulf Coast Gets HAB Advance Warning System

Within the last few years, scientists have used remote sensing to predict and monitor harmful algal blooms (HABs)—quick-growing micro-

scopic plants (sometimes called red tide) that can cause beach closures and contaminate seafood. In 2002, NOS applied this forecasting ability and created an e-mail system that notifies communities along the Gulf of Mexico when conditions are ripe for a harmful algal bloom event. An associated Web site includes information about environmental conditions that may affect the spread of harmful algal blooms. This advance notification is helping communities lessen the negative impacts from these noxious plants.

Rare Biological Communities Documented

NOS and the Monterey Bay Aquarium Research Institute conducted a week-long mission to document the unusual biological communities on and around the Davidson Seamount—a giant underwater mountain located near the Monterey Bay National Marine Sanctuary. Using a remotely operated vehicle, scientists collected living specimens and bottom samples and recorded hours of video. The seamount is believed to harbor a variety of unique marine life because of its unusual size and location.

Approved Nonpoint Programs Now Total 10

NOS and the Environmental Protection Agency fully approved two new state coastal nonpoint pollution programs, bringing the total number to 10. The Virgin Islands and Delaware joined Maryland, Rhode Island, California, Puerto Rico, Virginia, Pennsylvania, New Hampshire, and Massachusetts as the only coastal states/territories with fully approved plans. To develop a more comprehensive solution to the problem of polluted runoff in coastal areas, Congress expanded the Coastal Zone Management Act in 1990 to include a new section, entitled "Protecting Coastal Waters" (6217). States and territories with approved coastal nonpoint programs are eligible for Federal funds.

Health of U.S. Coral Reefs Assessed

Under the auspices of the U.S. Coral Reef Task Force, NOS released the first-ever assessment of the conditions of U.S. coral reefs. The interagency report highlights the increas-

ing degradation of shallow-water coral reefs near inhabited coastal areas, while distant reefs, where fishing pressure is low, remain in near-pristine condition. Coastal pollution, runoff, ship groundings, diseases, climate change, trade in coral, and destructive fishing practices are among the top-ranked threats to reef ecosystems. The report establishes a baseline against which future assessments can be compared, which will help scientists anticipate changes in ecosystem conditions.

Estuary Management Benefits from New Technology

Excessive nutrients from human activities, such as wastewater treatment and agricultural runoff, can lead to blooms of undesirable marine plants that reduce oxygen levels in estuaries and usually result in fish kills. Traditional nutrient sampling techniques are costly and time consuming. A technology development project funded by the Cooperative Institute for Coastal and Estuarine Environmental Technology produced a break-

through tool that improves the way scientists monitor nutrients. The new instrument allows sampling and analysis over extended periods of time, giving scientists and coastal managers the data needed to better deal with excess nutrients and their sources. A commercial version of the monitoring technology is expected by August 2003.

Coastal Communities

Pribilof Islands Restoration Program Well Underway

Under NOAA and its predecessor agencies, the United States operated a commercial fur-sealing fishery on Alaska's Pribilof Islands, contributing more than \$46 million to the U.S. treasury. NOS is leading NOAA's effort (authorized by the Pribilof Environmental Restoration Act of 1996 and Pribilof Islands Transition Act) to restore the islands from spoils left during the sealing operations. By the end of FY 2002, nearly half the cleanup work was completed. When the islands are fully restored, they will be transferred to Aleut Native Americans.

Prototype System Tracks Ocean Floor Changes

NOS demonstrated the Shallow-Water Positioning System (SWaPS), a prototype system that tracks changes in the ocean floor. SWaPS consists of a global positioning system (GPS) receiver and a digital camera mounted to a floatation device. It identifies underwater features, which are precisely positioned by the GPS, and stores their digital images. Scientists hope to find a variety of applications for SWaPS, especially in monitoring fragile



NOS' assessment of the conditions of U.S. coral reefs highlights the increasing degradation of shallow-water coral reefs near inhabited coastal areas, while distant reefs, where fishing pressure is low, remain in near-pristine condition.

marine resources and in assessing habitat damage from ship groundings.

Work Continues on Contaminated Hudson River

PCB contamination in New York's Hudson River has been historical and widespread. Coordinating with the Environmental Protection Agency and the state of New York, NOS has worked for 10 years to ensure that the site was properly assessed and a protective remedy was selected. In 2002, NOS released the Hudson River Natural Resource Damage Assessment Plan. The plan describes studies that are completed, are underway, or will be implemented by NOS and other agencies to determine the effects of the contamination on wildlife, fish, surface water (including river sediments), ground water, and air quality. Results from the studies will guide restoration efforts. Also, to assist in the remediation and restoration planning, NOS maintains the Hudson River Watershed Database and Mapping Project.



In response to reported allergic reactions to mail irradiated by the U.S. Postal Service following the anthrax mail incidents, NOS performed risk, chemical analysis, and indoor air quality assessments to ensure the safety and health of mail handlers and others in the Herbert C. Hoover building.

Restoring Natural Resources Near Los Angeles

The ocean dumping of DDT (dichlorodiphenyl trichloroethane) and PCBs (polychlorinated biphenyls) decades ago in the Los Angeles–Orange County area ravaged southern California's marine environment and decimated bald eagles and other wildlife along the coast. Through the Montrose Settlements Restoration Program, NOS has initiated several studies and surveys that will provide the public with accurate information about contaminated fish and other natural resources injured as a result of the dumping. In 2002, NOS also assisted in the reintroduction of the bald eagle to California's Northern Channel Islands by releasing juvenile bald eagles on Santa Cruz Island.

Indiana Joins Coastal Zone Management Program

The 34th state to join the Coastal Zone Management Program is now eligible for Federal funds to better manage its coastal areas. Under the program, Indiana has the opportunity to balance economic growth and sensible coastal development with protection of natural resources.

Ninety-Four New CORS Stations Added

NOS added 94 new Continuously Operating Reference Stations (CORS), bringing the total number of stations in its nationwide network to 323. The CORS network provides GPS measurements in support of three-dimensional positioning activities. CORS data assist in short-term weather forecasting by allowing meteorologists to measure the spatial distribution of water vapor in the atmosphere. Additional CORS applications include supporting the development of GIS, monitoring move-



In 2002, NOS assisted in the reintroduction of the bald eagle to California's Northern Channel Islands by releasing juvenile bald eagles on Santa Cruz Island.

ments in the Earth's crust, and supporting remote-sensing operations.

Coastal Hazards

Expertise Brought to Bear in Anthrax Incident

In response to reported allergic reactions to mail irradiated by the U.S. Postal Service following the anthrax mail incidents, NOS performed risk, chemical analysis, and indoor air quality assessments to ensure the safety and health of mail handlers and others in the Herbert C. Hoover building. NOS also facilitated coordination among the several Federal responders, including the National Institute of Standards and Technology, the National Institute for Occupational Safety and Health, and the Environmental Protection Agency.

Source of Mysterious Oil Spill Found

A mysterious oil spill off San Francisco has been blamed for the deaths of hundreds of seabirds

within NOS West Coast sanctuaries over the past decade. After an extensive search, NOS determined that the SS *Jacob Lukenbach*, which sank in a 1953 collision 17 miles southwest of the Golden Gate Bridge, was the culprit. A salvage operation to pump leaking oil from the sunken vessel began in June and was completed in mid-September. The vessel lies in the Gulf of the Farallones Marine Sanctuary.

Environmental Sensitivity Atlas Published

NOS expanded its catalogue of Environmental Sensitivity Index (ESI) atlases by publishing two new ESIs, one for the coastline from New Jersey to Rhode Island and another for the New York–New Jersey metropolitan area. An ESI is a map that contains specific information about the shoreline, including what natural and man-made resources are at risk during an emergency, such as a spill of hazardous materials. ESIs are an essential resource and quick reference for both planning for and responding to an emergency. NOS has created atlases for most U.S. coastal areas,

including Alaska, Hawaii, the Great Lakes, and the Trust Territories.

Abandoned Vessel Database Available

NOS has created an Internet-based database of over 150 abandoned vessels in U.S. waters to identify wrecks for further attention and to initiate removal of the highest-priority cases. Abandoned vessels can destroy coral habitats and disperse toxic chemicals and gear. The inventory continues to grow, as NOS adds newly discovered vessels to the database. Visitors to the Web site can enter additional information about a wreck or report a wreck not currently in the inventory.

Groundwork Set for Successful Restoration

Coastal areas and marshlands are in serious decline, making their restoration a national priority. In 2002, NOS provided remote-sensing and geodetic surveying technologies at a number of restoration sites. For example, NOS conducted positioning surveys and developed Digital Elevation Models for Poplar Point on the Anacostia River in Washington, D.C.; Fort McHenry in Baltimore,

Maryland; and Barren Island and Eastern Neck in Chesapeake Bay. NOS also collected and analyzed water levels for the models and to assist with successful restoration. Partners include the Maryland Port Administration, the Maryland Transportation Authority, the National Aquarium in Baltimore, and the U.S. Geological Survey.

***Pfiesteria* Revealed to Be Nontoxic**

Pfiesteria piscicida is a dinoflagellate associated with fish kills and human health problems in the mid-1990s in North Carolina and Maryland. Using sophisticated molecular technology adapted from human medical research, researchers from NOS, the University of North Carolina, and North Carolina State University found that *Pfiesteria* may have a very simple life cycle, without the complex, toxic stages indicated by past research. They presented this conclusion in the June 20th issue of the

In 2002, NOS provided remote-sensing and geodetic surveying technologies at a number of coastal areas and marshland restoration sites, including Barren Island and Eastern Neck in Chesapeake Bay. Photo: Stephen C. Delaney, U.S. Environmental Protection Agency





Nearly 140 years after the USS Monitor sank during a New Year's storm, NOS successfully raised the historic warship's revolving gun turret from the ocean floor. Photo: AP Pool/Steve Helber

Journal of Phycology, the leading U.S. publication on algae. Research will continue to identify the causes of fish kills and health problems previously attributed to *Pfiesteria*.

Organization and Culture

Hollings Marine Laboratory Opens

Construction was completed on the Hollings Marine Laboratory, located within the Fort Johnson campus of the South Carolina

Marine Resources Center in Charleston. The modern research facility is a cooperative project of NOS, the National Institute of Standards and Technology, the South Carolina Department of Natural Resources, the University of Charleston, and the Medical University of South Carolina. Named for Fritz Hollings, a U.S. senator from South Carolina, the laboratory is a gathering place for scientists who work on some of our Nation's most important and perplexing marine environment concerns.

Turret Home Again after 140 Years

In conjunction with the U.S. Navy and the Mariners' Museum in Newport News, Virginia, NOS successfully raised the USS *Monitor's* 150-ton revolving gun turret from the ocean floor, 140 years after it sank off the North Carolina coast. The massive gun turret was the warship's most prominent feature and a landmark in naval engineering. The first revolving gun turret in the world, it allowed two 11-inch Dahlgren cannons to be aimed independently from the ship's heading, a substantial fighting advantage. The cooperative expedition has recovered more than 600 artifacts from the historic Civil War vessel, including its steam engine, hydrometers, working thermometers, and several intact lantern chimneys.

Sustainable Seas Expedition Concludes

Co-sponsored by NOAA's National Marine Sanctuary Program and the National Geographic Society, and led by underwater explorer Dr. Sylvia Earle, the five-year Sustainable Seas Expedition ended in 2002. Using one-person submersibles equipped with cameras and scientific

PRODUCTS AND SERVICES

Nautical Charts

NOS produces the Nation's nautical charts in paper and electronic formats. These charts are indispensable to safe, efficient marine transportation and national security.

Shoreline Mapping

NOS surveys 95,000 miles of U.S. coastline to provide an accurate, official delineation of the national shoreline for nautical chart production and coastal resource management. The growth and sustainability of U.S. shipping, manufacturing, exports, and coastal development depend on accurate shoreline mapping.

Real-Time Data

By providing real-time information about water levels, tides and currents, salinity, and weather conditions in ports, Physical Oceanographic Real-Time Systems® (PORTS®)

mitigate coastal hazards and minimize delays in marine transportation. Recreational boaters also use PORTS® to avoid grounding and collisions during inclement weather.

Unique Ocean and Coastal Areas

NOS manages a system of 13 National Marine Sanctuaries and 25 National Estuarine Research Reserves. These unique areas foster scientific research, public education and recreation, and environmental stewardship through Federal, state, local, and private partnerships. They also contribute jobs and dollars to local economies.

Coastal Ecosystem Monitoring

By measuring water quality, contaminants, sources of pollution, biodiversity, and changes in the use of coastal land and waters, NOS helps states and communities to sustainably use and protect their valuable resources.

instruments, scientists explored deep-water coral and hard-bottom communities from the west coast of Florida to Louisiana. They focused on characterizing these unique habitats, studying the corals, sponges, and other organisms that comprise the reefs, as well as the fish and invertebrate communities that rely upon them for food and shelter.

Portland Wreck Found

NOS confirmed the final resting place of one of New England's most sought-after and mysterious shipwrecks, the steamship *Portland*.

Found off the Massachusetts coast within the boundaries of Stellwagen Bank National Marine Sanctuary, the 281-foot steamer fell prey to a vicious storm in November 1898, as it made its way from Boston to Portland, Maine. All 192 lives aboard were lost. The wreck is afforded protection unavailable in other waters, because sanctuary regulations prohibit the disturbance of submerged cultural or historical resources, including artifacts and pieces of shipwrecks.

Ocean Policy Commission Supported

NOS support of the U.S. Commission on Ocean Policy

included maintaining the Commission's official Web site, tracking and reporting on the Commission's meetings, and establishing an internal Web site chronicling NOAA's interactions with the Commission.

Convened in September 2001, the Commission is charged with developing recommendations for a comprehensive and coordinated national ocean policy. Its final report to the President and Congress is due in June 2003.

FUTURE OUTLOOK

With waterborne commerce expected to triple over the next three decades, the need for modernized navigation services will continue to grow. The new century will also bring us face-to-face with growing concerns about food, security, energy, and environmental and economical health. By positioning products and processes for the decades ahead, NOS will continue to ensure that the Nation's coastal and marine resources remain safe, healthy, and productive. Specific priorities include:

- developing real-time environmental and prediction systems and location, ship dynamics, and precise-depth data;

- streamlining the process of collecting and processing data and delivering charts to the maritime community;
- reducing pollutant runoff and addressing contaminants that threaten marine resources and human health;
- predicting and reducing hypoxia and harmful algal blooms;
- mitigating the effects of natural hazards;
- conserving and sustaining coral reefs;
- exploring the ocean frontier; and
- developing a comprehensive coastal ocean observing system.



NOS manages the National Spatial Reference System, which serves as a baseline for all types of highly accurate navigation, survey, and positioning work.

Emergency Response

NOS responds to more than 100 marine oil and chemical spills every year, providing information to the U.S. Coast Guard for containing and cleaning up spills of hazardous materials. NOS also works closely with the Environmental Protection Agency and other partners to protect and restore coastal resources damaged by releases of hazardous materials.

Pinpoint Positioning

NOS manages the National Spatial Reference System, which serves as a baseline for all types of highly accurate navigation, survey, and positioning work. For example, the system enables ships to pinpoint their location within three to five meters, at all times and in all weather, and is used as the basis for all Global Positioning System data.

Decision-Making Support

NOS provides a wealth of science, training, and tools to help coastal communities make decisions about such concerns as land use, waterfront development and revitalization, habitat conservation and restoration, and water quality and quantity. For example, Geographic Information System maps of coastal habitats and information about storms and other risks help coastal managers mitigate a range of potential hazards.

Coastal Research

NOS conducts and supports research on a variety of issues that threaten coastal waters, habitats, and ecosystem and human health, including pollutants, harmful algal blooms, invasive species, and changes in land use and climate.

National Marine Fisheries Service

Sustaining, Protecting, and Rebuilding Our Nation's Living Oceans



William T. Hogarth, Ph.D.
Assistant Administrator

The National Marine Fisheries Service

(NOAA Fisheries) is dedicated to protecting and preserving our Nation's living marine resources and their habitats through scientific research, fisheries management, law enforcement, and habitat conservation. NOAA Fisheries is a world leader in fisheries research, providing a sound scientific foundation for the stewardship of living marine resources. NOAA Fisheries is also a leading voice for

commercial and recreational fisheries from the Atlantic Ocean and Gulf of Mexico to the Pacific Ocean. We use our interdisciplinary expertise in the biological, physical, and social sciences and in information technology to monitor, assess, and predict the status and trends of marine stocks, their natural environment, and the socioeconomic benefits they provide. We will continue to focus our efforts on conservation, management, and sustainable development as we face new challenges in the 21st century.

ACCOMPLISHMENTS

Habitat

Marine Debris Removed from Hawaiian Reefs

On November 20, 2001, a team of scientists and divers returned from three months at sea in the northwestern Hawaiian Islands, where they collected more than 60 tons of nets and derelict fishing gear from fishermen in the North Pacific. Project partners included NOAA, the State of Hawaii, the U.S. Fish and Wildlife Service, the U.S. Coast Guard, the U.S. Navy, Hawaii Sea Grant, the Ocean Conservancy, and other local agencies and private organizations. NOAA also funded three chartered commercial vessels for the cleanup tour. Scientists estimate more than 200 tons of derelict fishing gear are still destroying fragile coral reefs or threatening endan-

gered species, such as the Hawaiian monk seal, sea turtles, and a variety of seabirds and other wildlife. This was the second year of a four- to five-year plan to remove years of accumulated debris.

NOAA and The Nature Conservancy Restore Coastal Habitats

NOAA Fisheries' Restoration Center and The Nature Conservancy have formed a three-year partnership to restore habitat in some of America's most valuable coastal ecosystems. Projects currently underway during the partnership's first year stretch across communities from California to Virginia. The total value of this initiative is expected to exceed \$4 million over its three-year span. States and territories containing anadromous, estuarine, and marine species are eligible to compete for grants typically ranging from \$25,000 to \$75,000.

NOAA Supports Trout Unlimited Restoration Efforts

On October 25, 2001, NOAA and Trout Unlimited announced a new partnership to restore habitat vital to the conservation of America's coastal fisheries. Under the partnership, NOAA will provide up to \$1 million over three years in support



of Trout Unlimited habitat restoration projects. The initial round of projects selected for 2001 funding include Snohomish, Washington; Devil's Gulch, California; Powell Creek, Oregon; and Norwalk River, Connecticut. Many of the projects chosen involve Pacific and Atlantic salmon.

Final Rule Published for Essential Fish Habitat

On January 17, 2002, NOAA Fisheries published final regulations implementing the essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act. The regulations provide guidelines for fishery management councils to identify and conserve necessary habitats for fish as part of Federal fishery management plans. The regulations also establish coordination and consultation procedures to be used by NOAA Fisheries and other Federal agencies to protect habitats identified as EFH. As part of the public rule-making process, NOAA Fisheries held five separate public comment periods while developing the regulations, and held more than 20 public meetings and workshops.

Sustainable Fisheries

Top 10 U.S. Fishing Ports for 2001 Announced

During FY 2002, commercial fishermen landed 834.5 million pounds of fish at Dutch Harbor Unalaska, Alaska, making it the port with the highest volume of fish landings in the country for the thirteenth consecutive year. For the

Christy Kistner, of the Honolulu Laboratory, carefully removes derelict fishing gear from a coral reef. Photo: Gregg Schoor, Southwest Fisheries Science Center



NOAA Fisheries' Restoration Center and The Nature Conservancy have formed a three-year partnership to restore habitat in some of America's most valuable coastal ecosystems.

second consecutive year, New Bedford, Massachusetts, claimed the highest value of fish landings in the country: \$150 million. The \$4.2 million increase over New Bedford's 2000 value was due in part to improving groundfish stocks and an increase in landings of Atlantic cod, yellowtail, and winter flounder.

Cooperative Research Begun on Georges Bank Groundfish

NOAA Fisheries scientists and fishermen from Maine to Massachusetts have begun to conduct research in Closed Area II of Georges Bank, which was closed to groundfishing eight years ago to protect cod, haddock, and yellowtail stocks. Since then, populations of haddock and Georges Bank yellowtail have improved markedly. Recommended by the New England Fishery Management Council and funded by NOAA Fisheries, this research involves two fishing vessels carrying scientific

observers to make concurrent fishing trips each month for a six-month period inside the closed area. This research will help determine the status of yellowtail within Closed Area II and whether they can be safely harvested without impeding the recovery of Georges Bank cod.

During FY 2002, commercial fishermen landed 834.5 million pounds of fish at Dutch Harbor Unalaska, Alaska, making it the port with the highest volume of fish landings in the country for the thirteenth consecutive year. Photo: William Folsom, NOAA Fisheries





NOAA Fisheries is implementing a long-term plan for a robust social science program to better evaluate the socioeconomic and cultural impacts of regulatory actions on U.S. coastal fishing communities.

Scientists Work to Improve Fishery Stock Assessments

A panel of NOAA Fisheries senior scientists recently completed an evaluation of how stock assessments are conducted and how to improve them. The Stock Assessment Improvement Plan examines gaps in fisheries data and evaluates available data for all 950 species the agency manages. The evaluation shows that existing fishery data are too sparse to adequately assess more than 60 percent of Federally regulated stocks in the United States. The scientists call for increased partnerships and staff to boost the agency's data collection and analysis capabilities. Implementation of this plan will give fishery managers, fishermen, and others interested in marine conservation more confidence in fisheries science and fishery management decisions.

Fish Stocks Declared to Be Trending Upward

Recently, NOAA Fisheries conducted an analysis of progress made during the past five years toward ending overfishing and rebuilding overfished (depleted) fish stocks. The results confirm that stocks under NOAA Fisheries' and the

Fishery Management Councils' jurisdiction have improved steadily and incrementally. Overfishing has been eliminated for several commercially and recreationally important major species, such as Gulf of Maine haddock, Atlantic bluefish, South Atlantic scamp, Gulf of Mexico gag grouper, and Pacific bank rockfish. In addition, several previously depleted stocks have been rebuilt to where they are no longer overfished, including Atlantic redfish and Bering Sea snow crab, and some have been fully rebuilt, such as Gulf of Maine/northern Georges Bank stocks of silver and red hake. However, given that many stocks are still experiencing overfishing or are currently in an overfished state, and that the status of many stocks is still not adequately known, it is evident that we still have much to accomplish.

Recently proposed changes to the existing regulations for seabird avoidance measures were based on results from a unique cooperative research effort between NOAA Fisheries and several of its partners. Photo: Jim McCallum, NOAA Fisheries

Planning Continues for Social Science Program

NOAA Fisheries is implementing a long-term plan for a robust social science program to better evaluate the socioeconomic and cultural impacts of regulatory actions on U.S. coastal fishing communities. As part of NOAA's fisheries modernization initiative, the establishment of a modern social science program has been a key funding priority the last several years. The recent hires of economists and social scientists are the initial investments in a longer-term plan that envisions an integrated staff of social scientists to outline social science data needs, establish and implement surveys for data collection, and conduct analyses to monitor and predict the impacts of management decisions on people from both socio-cultural and socio-economic standpoints. The agency has long recognized that for living marine resource management to be effective in the long run, understanding the social, cultural, and economic consequences of management actions is necessary.





Satellite-Based Monitoring System Supports Enforcement

NOAA Fisheries is increasingly relying on satellite technology for monitoring compliance with closed-area fishing regulations under the Magnuson–Stevens Fishery Conservation and Management Act. A ruling against a New Bedford, Massachusetts, fishing vessel and its captain was the first Federal fisheries prosecution based exclusively on vessel-tracking data gathered by the satellite-based Vessel Monitoring System. Penalties imposed for repeatedly entering an area closed to fishing included a fine of \$250,000 and the permanent revocation of the vessel's Federal fishing permit and the captain's operator permit. This decision sets an important precedent and supports the hard work that NOAA Fisheries enforcement agents devote to protecting marine fisheries for honest fishermen.

Collaborative Research Improves Seabird Avoidance Measures

The North Pacific Fishery Management Council recommended changes to the existing regulations for seabird avoidance measures required in the groundfish and halibut hook-and-line fisheries off Alaska. The proposed changes were based on results from a unique cooperative research effort that included fishery scientists from Washington Sea Grant Program and the University of Washington, longline fishers, NOAA Fisheries, the U.S. Fish and Wildlife Service, and the North Pacific Fishery Management Council. Scientists worked on commercial fishing vessels with the North Pacific Longline Association and Fishing Vessel Owners Association. Rigorous tests were conducted under conditions with high bird abundance and interaction. Six deterrent devices were tested in two target fisheries in two different fleets over two years, resulting in over

NOAA Fisheries, the U.S. Fish and Wildlife Service, Maine's Atlantic Salmon Commission, and private aquaculture companies in Maine are participating in a multiagency effort to conserve and restore wild Atlantic salmon populations in U.S. rivers. Photo: Northwest Fisheries Science Center.

1 million hooks being observed in the sablefish portion of the experiment, and over 6 million hooks observed in the Pacific cod portion. This collaborative process allowed for buy-in from the industry early on in the process, and helped create a sense of ownership in the project and, most important, in the results.

Ban on Shark Finning Extended to the Pacific

On March 13, 2002, the Federal ban on shark finning was extended to the Pacific Ocean to reduce waste of shark meat. The new regulations, which implement the Shark Finning Prohibition Act of 2000, forbid Federally regulated fishing vessels from carrying or landing shark fins without the entire shark carcass and also prohibit foreign



vessels from landing fins in U.S. ports without corresponding shark carcasses. This ban is consistent with international agreements to better manage shark populations, including the Code of Conduct for Responsible Fishing of the United Nations Food and Agriculture Organization, the International Plan of Action for Sharks, and the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Species.

Protected Resources

Mature Atlantic Salmon Stocked in Maine Rivers

In a multiagency effort to conserve and restore wild Atlantic salmon populations in U.S. rivers, nearly 800 adult Atlantic salmon were stocked in Maine's Dennys, Machias, and St. Croix rivers. This final phase of a five-year collaborative project begun in 1997 by NOAA Fisheries, the U.S. Fish and Wildlife Service, Maine's Atlantic Salmon Commission, and private aquaculture companies in Maine was the first attempt to stock adult Atlantic salmon in U.S. waters. The fish average almost 18 pounds and are about three feet long. Each

NOAA Fisheries is seeking public comment on proposed changes to fishing rules to better protect North Atlantic right whales and other large whales from entanglement in fishing gear.

PRODUCTS AND SERVICES

Law Enforcement

NOAA special agents are charged with protecting the Nation's living marine resources under a variety of Federal laws and regulations. Enforcement activities include investigating criminal and civil violations; seizing contraband and illegal goods; implementing advanced technologies through a Vessel Monitoring System (VMS) program to monitor and verify positions of fishing vessels using satellite-based tools; and Community-Oriented Policing and Problem Solving (COPPS) to promote voluntary compliance through public awareness and education.

Regional Stock Assessments

NOAA Fisheries Science Centers provide the scientific basis for a wide range of management options for preserving living marine resources while supporting the economic performance of the domestic fisheries sector.

Fisheries Survey Vessels

NOAA is committed to replacing its rapidly aging fleet of fisheries survey vessels. The first replacement ship, assigned to Kodiak, Alaska, is currently under construction,

female is capable of laying approximately 14,000 eggs in a series of nests called *redds*, dug in gravelly, fast-flowing sections of the river. Each stocked fish carries an implanted tag that will make it possible for scientists who encounter the fish later to know the date, time, and location of stocking and some biological information about the individual fish.

New Methods Proposed for Reducing Whale Entanglements

NOAA Fisheries is seeking public comment on proposed changes to fishing rules to better protect North Atlantic right whales and other large whales from entanglement in lobster traps, pots, and gillnets along the U.S. East Coast. The proposed rule changes would add to existing measures to reduce large whale entanglements.

Steller Sea Lion Protection Measures Released

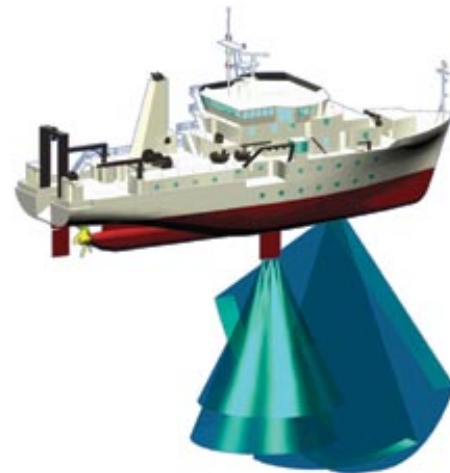
On November 28, 2001, NOAA Fisheries released the Final Supplemental Environmental Impact Statement on Steller Sea Lion Protection Measures. This document is intended to: (1) provide information on the potential environmental impacts that could occur from implementing a suite of fisheries management measures, to ensure that the groundfish fisheries in the

Gulf of Alaska and the Bering Sea and Aleutian Islands do not jeopardize the western population of Steller sea lions or adversely modify its critical habitat; and (2) meet the National Environmental Policy Act's purpose of fostering excellent actions and better decisions that are based on understanding the environmental consequences of actions.

FUTURE OUTLOOK

NOAA Fisheries bears the stewardship responsibility for the largest Exclusive Economic Zone in the world. New legislation, evolving management philosophies, and scientific advances have created new opportunities for managing the Nation's living marine resources. We will continue to adopt the necessary tools and apply fiscal and programmatic resources to ensure the integrity of our marine ecosystems, and to sustain their socio-reconomic and intangible benefits to the American people.

A major regulatory streamlining project is underway to enhance NOAA Fisheries' management programs for living marine resources. This project is particularly focused on integrating current statutes—such as the Magnuson–Stevens Fishery Conservation and Management Act, the National Environ-



The first ship to modernize NOAA's rapidly aging fleet of fishery survey vessels is currently under construction, with delivery scheduled for late 2004.

mental Policy Act, the Endangered Species Act, and the Marine Mammal Protection Act—as much as possible under their current structure, to address fishery actions more effectively. The project is also developing alternative collaborative processes, where appropriate, and working on permit processes.

Several other projects underway to modernize fisheries are taking advantage of recent developments in “e-commerce,” including a review of the Sustainable Fisheries Act, and electronic rulemaking and permit systems. In short, within two to three years NOAA Fisheries expects to significantly improve our conservation and management efforts, face fewer legal challenges, and generally provide better service to our constituents.

with delivery scheduled for late 2004. Contract options for three additional survey vessels are contingent on receiving additional funding.

Seafood Inspection Services

NOAA Fisheries provides a variety of professional inspection services to the fishing industry, which ensure compliance with all applicable Federal food regulations. Annual participants include more than 2,500 importers and exporters.

Annual Report on the Status of Fisheries

The annual *Report to Congress on the Status of Fisheries of the United States* reviews the status of 905 fishery stocks in the U.S. Exclusive Economic Zone and identifies stocks that are overfished or are approaching a condition of being overfished, under definitions mandated by the reauthorized Magnuson–Stevens Fishery Conservation and Management Act.

Office of Oceanic and Atmospheric Research

Where Science Comes to Life



Louisa Koch, Acting Assistant Administrator

NOAA's primary research and development organization, the Office of Oceanic and Atmospheric Research (NOAA Research), studies the Earth system from the deep ocean to the sun. NOAA Research delivers products and services that help us to understand and predict environmental changes on local to global scales and at time scales from minutes to centuries.

The NOAA Research network consists of 12 internal research laboratories, extramural research at 30 National Sea Grant university and research programs, 6 undersea research centers, a research grants program through the Office of Global Programs, 11 joint cooperative institutes with academia, the Office of Ocean Exploration and the Climate Observations and Service Program.

Ultimately the information that NOAA Research provides is used by decision makers at all levels to prevent the loss of human life and conserve and manage natural resources while maintaining a strong economy. NOAA Research is integrated across three central research themes: climate; weather and air quality; and ocean, coastal, and Great Lakes resources.

ACCOMPLISHMENTS

Space Weather Delivery System Launched

The Federal Aviation Administration and United Airlines recently implemented a system that allows the airline to receive space weather messages from NOAA's Space Environment Center via the same dedicated systems that deliver conventional meteorological data to the airline for routine use in flight dispatch and operations. The new system delivers daily and three-hour summary and forecast messages, as well as event-driven messages, including warnings and alerts that are of specific interest to the airline in managing its polar routes and other long-distance flight operations. The message system brings space

weather into the mainstream of procedures involving the critical access and application of weather data to the flight operations of a major commercial carrier.

World War II Sunken Ship Discovered

During a routine training dive, NOAA-supported submersibles discovered the Japanese midget submarine that had purportedly been sunk by the USS *Ward* on the morning of December 7, 1941. The team of scientists from the Hawaii Undersea Research Laboratory documented a hole in the base of the conning tower of the midget sub, right where the USS *Ward* said it would be. The discovery, which represents a significant historical find, sparked worldwide attention.

Phased-Array Radar Re-engineered

Phased-array radar (PAR) is a leading candidate to increase warning lead times for severe weather, such as tornadoes, large hail, and heavy snow. PAR reduces the weather scan time from five or six minutes to less than one minute. NOAA researchers are re-engineering the SPY-1 radar, developed by Lockheed Martin for the U.S. Navy, to support weather detection. If proven cost-effective, PAR technology could be the next major technical upgrade to the National Weather Service's national network of weather radars. PAR may be used to simultaneously detect severe weather, track aircraft, and serve as a vertical wind profiler.

New Millennium Observatory Studies Seafloor

The New Millennium Observatory is a multi-year seafloor observatory located on Axial Seamount, part of



the Juan de Fuca Ridge, 250 miles off Oregon's coast. Scientists remotely examine the relationships at the site between volcanic events and the chemistry and distribution of hydrothermal vents and the communities they support. Scientists use *in situ* monitoring and a two-way communication system to retrieve monitoring data from the seafloor and relay it to shore.

FOCI Programs Develop Biophysical Model

Fisheries–Oceanography Coordinated Investigations (FOCI) are collaborative biological and physical programs that work to understand the influence of the environment on commercially valuable fish and shellfish stocks in Alaskan waters. In recent years, pollock landings were the largest in the world by weight. FOCI's operational goal is to forecast pollock recruitment. NOAA Fisheries uses the forecast to advise the North Pacific Fishery Management Council as it sets catch limits for the species. FOCI programs have also developed a sophisticated biophysical model that (1) simulates the currents, water temperature, and



Fisheries–Oceanography Coordinated Investigations (FOCI) are collaborative biological and physical programs that work to understand the influence of the environment on commercially valuable fish.

Photo: NOAA Marine and Aviation Operations

salinity of the ocean; (2) provides nutrients, phytoplankton, and zooplankton; and (3) contains and tracks development of pollock eggs, larvae, and juveniles.

Documentary Wins Emmy Award

"The *P. piscicada* Files," co-produced by Maryland Sea Grant and Maryland Public Television, won an Emmy Award for Best Documentary. Written and directed by long-time Sea Grant filmmaker Michael W. Fincham, the hour-long documentary examines the origins and end results of the "Pfiesteria hysteria" that gripped much of the mid-Atlantic in 1997, when the toxic microbe *Pfiesteria piscicida* was blamed for sick fish and sick people along three Maryland rivers. The documentary describes how *Pfiesteria* quickly became a controversial national issue and considers what

A new system allows United Airlines to receive space weather messages from NOAA's Space Environment Center via the same dedicated systems that deliver conventional meteorological data to the airline for routine use in flight dispatch and operations. Photo: NOAA Research



NOAA Research scientists lead and participate in field experiments focused on the study of significant environmental phenomena. Photo: NOAA Underwater Research Program

Pfiesteria could mean for the future of Chesapeake Bay.

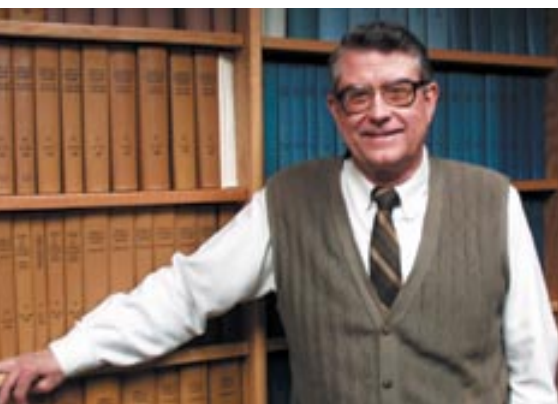
NOAA Scientist Co-Chairs IPCC Assessment

In 2002, NOAA Research scientist Susan Solomon was named one of the two co-chairs of Working Group I of the Intergovernmental Panel on Climate Change (IPCC). The Working Group serves the scientific community and national, international, and private decision makers by providing periodic unbiased, balanced, scientific information on the physical understanding





NOAA Research scientist Susan Solomon was named one of the two co-chairs of Working Group I of the Intergovernmental Panel on Climate Change. Photo: NOAA Research



Since 1989, NOAA laboratory director Dr. Daniel L. Albritton has served as an international co-chair of the Scientific Assessment Panel for the United Nations Montreal Protocol. Photo: NOAA Research

of the climate system and climate change. Dr. Solomon is the only U.S. member in the slate of new appointments. Her six-year term (2002–2008) will support the preparation of the IPCC's Fourth Assessment, scheduled for publication in 2007.

NOAA Provides Leadership for Montreal Protocol

NOAA laboratory director Dr. Daniel L. Albritton has served as one of four international co-chairs of the Scientific Assessment Panel for the United Nations Montreal Protocol since 1989. The panel's latest Scientific Assessment of Ozone Depletion was completed in 2002. This assessment contains the most up-to-date understanding of ozone depletion and reflects the thinking of hundreds of interna-

tional scientific experts who contributed to their preparation and review. NOAA Research scientists also made other substantial contributions to the reports by serving as lead authors, co-authors, contributors, reviewers, coordinating editors, and editorial and computing support staff.

Analytical Tool Transforms Seafood Industry

Sea Grant has been working with the medical industry to implement a risk analysis and management tool based on the existing Seafood Hazard Analysis and Critical Control Points (HACCP) Alliance. The HACCP concept is constructed to anticipate problems and has been applied widely within the medical industry, from the production of safer medical devices to the distribution of blood products.

NOAA Leads Air Quality Study

In the summer of 2002, NOAA Research led the multi-organizational New England Air Quality Study to identify why the northeastern United States has some of the worst air quality in the country. The campaign will lay the groundwork for evaluating the skill of air-quality forecasting. NOAA's largest research vessel, the *RONALD H. BROWN*, monitored air pollutants and assessed how they travel through the region. Monitoring was also conducted at ground-based sites throughout New Hampshire and on NOAA aircraft. The efforts focused on collection and analysis of physical and chemical components of the atmosphere. NOAA Research will use the data to refine and implement

During the summer of 2002, scientists aboard the NOAA ship RONALD H. BROWN monitored air pollutants and assessed how they travel through New England. Photo: NOAA Marine and Aviation Operations

high-resolution weather and air-quality models.

Genetic Research Sheds Light on Invasive Species

The problems associated with preventing and managing invasive species call for the development of better tools for understanding why species invade and what conditions may trigger their invasion. Until recently, it was unclear why the common weed *Phragmites australis*, a plant native to both U.S. coasts, became invasive in the last century. Genetic research supported in part by the Sea Grant program has shed some light on this mystery. An invasive North African strain of *P. australis* was introduced into the United States in the 19th century, perhaps in ships' solid ballast. Apparently, the strain has been spreading ever since, crowding out other wetland plants as well as native North American *P. australis*.



This type of information can help managers make informed decisions about how to control invasions of particular species.

500th Argo Float Deployed

NOAA Research reached a milestone in the summer of 2002, when the 500th Argo float was deployed. The Argo array is part of the Global Climate Observing System and Global Ocean Observing System. An Argo float is an autonomous float that drifts throughout the top 2,000 meters of the ocean, collecting data on temperature and salinity. It surfaces every 10 days to beam the data to satellites. Data from the floats are used to improve weather forecasts of seasonal or other climate events, such as droughts and flooding. This milestone puts NOAA and its partners one-sixth of the way toward reaching their commitment to deploy 3,000 floats by 2006. The United States is one of 14 countries

participating in the Argo program, and NOAA is the lead U.S. agency.

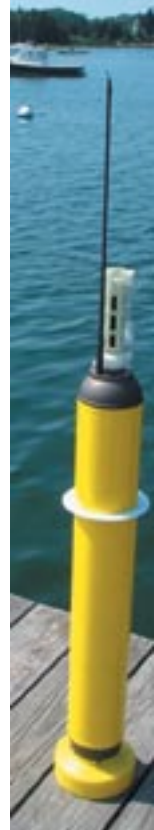
FUTURE OUTLOOK

The NOAA Research vision is to create, through inspired research, the scientific basis for more productive and harmonious relationships between humans and their environment. Society will increasingly rely upon accurate weather and climate information to diminish the harsh impacts of droughts, flooding, and other environmental threats. NOAA Research is committed to building services that help citizens respond to these threats, as well as examining these phenomena for potential opportunities in key areas, such as agriculture and natural resource management.

NOAA Research strives to balance its near-term responsibility to its primary customers both inside and

NOAA Research reached a milestone in the summer of 2002, when the 500th Argo float was deployed. Photo: NOAA Research

outside of NOAA with its long-term commitment to conduct visionary research that will be critical for managing future environmental and societal threats. This dual responsibility requires us to perform research that leads to the transfer of information and new technologies, as well as to explore the unknown and develop important new concepts. Through increased dialogue with our constituents, we are working to be more responsible to our customers' and partners' needs and to engage them as we set new directions for research.



PRODUCTS AND SERVICES

Environmental Observation and Monitoring

NOAA scientists collect global air samples to learn how the composition of the atmosphere varies over time, monitor ozone in the atmosphere, record solar radiation, and conduct oceanic observations. Much of these data are collected through partnerships throughout the world. These time-series measurements have allowed scientists to resolve important scales of oceanic and atmospheric variability. In addition, long-term observations of a variety of physical, chemical, and biological parameters are used to monitor environmental conditions and to provide a baseline against which future changes can be assessed.

Interagency Field Experiments

NOAA Research scientists lead and participate in field experiments focused on the study of significant environmental phenomena. These experiments improve our ability to understand and predict behavior of the Earth's climate and atmosphere. Major campaign foci include ocean-atmosphere coupling in the eastern tropical Pacific; natural and anthropogenic climate forcing by aerosols and their feedbacks on regional and global climate; intercontinental transport of manmade pollution, with an emphasis on ozone, fine particles, and other chemically active "greenhouse" compounds; and physical processes that occur in the oceanic and atmospheric regions influenced by ocean surface waves.

Global Models

NOAA Research models of the atmosphere, ocean, and climate have increasingly sophisticated predictive capabilities, giving leaders in government and industry a greater understanding of the range of possible future outcomes of today's decisions.

Scientific Assessments

NOAA Research plays a leading role in periodically assessing the state of scientific understanding on many environmental issues facing government and industry decision makers, including climate change, air quality, and ozone depletion.

Operational Products

NOAA Research supports a variety of operational products, including:

- providing the Nation's official source of space weather alerts and warnings;
- collecting real-time data from moored ocean buoys for improved detection, understanding, and prediction of El Niño and La Niña events; and
- supporting an interactive Web-based model used to predict the consequences of atmospheric releases of radioactivity and other potentially harmful materials.

National Weather Service

Working Together to Save Lives



Brig. Gen. Jack Kelly, USAF (Ret.)
Assistant Administrator

Approximately 35 percent of all Americans—some 100 million people—live in areas with a high risk for natural disasters, and this number is rising yearly. Today, a large majority of all presidential-declared disasters are weather- and flood-related. Moreover, our water resources are the lifeblood of the economy and our standard of living.

The National Weather Service (NWS) provides weather, water, and climate warnings and forecasts for the United States, its territories, adjacent waters, and ocean areas. NWS data and products form a national information database and infrastructure that are used by other governmental agencies, the private sector, the public, and the global community.

Over the last several years, the collective focus of NWS has been on delivering products and services, while completing myriad activities associated with NWS modernization and restructuring. New observing systems (space, radar, and ground), modern information technology assets, and training programs have combined to improve the quality of NWS products for the protection of life and property and the enhancement of the national economy.

Weather services cost each American household about \$13 a year. This investment allows NOAA to issue more than 734,000 fire, weather, public, aviation, and marine forecasts; 850,000 river and flood forecasts; and 45,000–50,000 potentially life-saving severe weather warnings annually.

ACCOMPLISHMENTS

NCEP Central Forecast Guidance Improved

During FY 2002, the National Centers for Environmental Prediction (NCEP) improved its three-day precipitation forecast accuracy score by 40 percent, largely due to improvements in the “eta” model’s resolution from 22 km to 12 km. The accuracy of three-day precipitation forecasts has a direct connection to improvements in flash flood and river flood forecasts and warnings.

Through the NOAA/NASA Joint Center for Satellite Data Assimilation, NCEP’s first-ever use of research satellite data from the Tropical Rainfall Measuring Mission and QUIKSCAT satellites in operational models yielded a 17 percent improvement in model forecast accuracy during a two-month assessment period. NCEP also contributed to the successful NOAA El Niño forecast in February 2002, when many experts outside of NOAA questioned whether one would occur. NCEP’s

Climate Prediction Center forecast the severe drought conditions that occurred over the past year.

AWIPS “Build 5” Software Released

Culminating three years of development, integration, and testing, the release of AWIPS Build 5 software improved NOAA’s ability to produce weather watches and warnings, provide new data sets to forecasters, improve forecast verification, provide advances in hydrologic and river forecasting, and improve radar data processing and display. Build 5’s weather event archiving capability supports the NWS weather event simulator to provide on-site training on real-weather cases.



NOAA Weather Radio Expanded and Improved

NWS added 108 new NOAA Weather Radio (NWR) stations in FY 2002, bringing the NWR network to 746 stations covering 95 percent of the U.S. population. In addition, during FY 2002 NWS implemented the NWR Voice Improvement Program, the first major upgrade to the NWR automated voice. Using concatenated voice technology, this upgrade has improved the basic understanding and effectiveness of weather warning and forecast information broadcast over NWR.

AHPS Implemented on Schedule

NWS implemented the Advanced Hydrologic Prediction Service (AHPS) on schedule at 113 new locations within midwestern and eastern states, bringing implementation to 275 out of 4,011 locations nationwide. Enhanced short-term predictions of river levels and longer-term probabilistic forecasts are now available via information-rich displays on the Internet.

AHPS Helps Save West Virginia Town

On May 2–3, 2002, the Ohio River Forecast Center used recently developed AHPS procedures to forecast flooding on the Tug Fork in West Virginia's Big Sandy River basin. Heavy rain fell across the region where West Virginia, Virginia, and Kentucky meet and produced widespread flash flooding along the Tug Fork River. The advanced flash flood warnings issued by NWS provided five hours



A 40 percent improvement in the accuracy of the National Centers for Environmental Prediction's three-day precipitation forecasts has significantly increased the accuracy of flash flood and river flood forecasts and warnings.

of lead time for local officials to evacuate about 1,500 residents and close the flood walls to protect downstream communities before the river rose 37 feet.

Tornado Warnings Save Lives in Indiana

On September 20, 2002, several powerful tornadoes moved across southern and central Indiana, damaging more than 80 buildings and injuring about 125 people. NWS issued 12 tornado warnings with an average lead time of 24 minutes. The fact that no one was killed was credited to the timely warnings and alerts. Indiana Governor Frank O'Bannon said: "Ellettsville and Martinsville had 20 minutes of sirens and information out that a tornado was coming. They think it saved lives."

Mariners Get Graphical Wind/Wave Forecasts

In December 2001, the Tropical Prediction Center/National Hurricane Center began issuing

High Wind/Wave graphic forecasts for the Atlantic and Pacific Oceans. The new product alerts mariners to dangerous wind and sea areas. The graphics depict high winds and associated seas based on the latest issued High Seas Forecasts from the Marine Prediction Center and the Tropical Prediction Center. The graphic forecasts are sent via radio-fax and are accessible on the Internet at www.weather.noaa.gov.

Teamwork and Communication Saved Firefighters

Coordination between two NWS offices and the Casper Interagency Dispatch Center in June 2002 may have saved dozens of firefighters from being trapped by a wind shift while battling the Daley Fire in northeastern Wyoming. The evening forecast called for a dramatic change in wind speed and direction. Staff at the NWS Riverton, Wyoming, and Rapid City, South Dakota, forecast offices began calling incident commanders in the field and fire control

Volunteer Cooperative Observer Jamie Morris, a water treatment Operator at the water plant in Roanoke, Virginia, checks a rain gauge. More than 11,000 individuals and organizations provide NWS with twice-daily temperature and precipitation observations, which form the Nation's climate data archive. Photo: Marc Kagan, NOAA



National Hurricane Center Director Max Mayfield previews Hurricane Michelle's track for (from left) Jim Lushine, Warning Coordination Meteorologist, WFO, Miami; Chuck Lanza, Director, Emergency Management, Miami-Dade County; and an unidentified aide. Photo: Andrew Newman, Federal Emergency Management Agency Reserves

centers at several fires that would be affected by the weather change. Even though conditions seemed normal in the field, all the incident commanders heeded the warning without question, and ordered firefighters to disengage activities and move to safety zones. Minutes after 40 firefighters were pulled off fire lines, winds in the Daley Fire area increased from 20 mph to 70 mph and switched direction 180 degrees. According to Forest Service reports, the flames ran through three miles of tinder-dry ponderosa pine, juniper, sagebrush, and grass in less than two hours.

Improved Flood Forecasts for Colorado Office and Native Americans

In June 2002, wildfires burned almost 275,000 acres of White Mountain Apache land, drastically changing the landscape and soil cover, and raising ground temperatures to an estimated 2,000 degrees Fahrenheit. The burned vegetation and extreme heat created a crust on the soil, which dramatically increased the water runoff efficiency of most basins in the burn area. NWS and U.S. Army Corps of Engineers hydrologic models estimated that runoff could increase from 200 to 400 percent above pre-burn conditions. Working with representatives of the White Mountain Apache Tribe's Hydrology

Water Resources Program, NWS hydrologists revised the parameters of the Sacramento Soil Moisture Accounting Model, and implemented new forecast service for Carrizo and Cibecue Creeks available to the Weather Forecast Office in Flagstaff and the Tribe, thereby improving the accuracy of water runoff predictions and resulting flood forecasts.

U.S. and Canada Adopt Updated Wind Chill Index

On November 1, 2001, NWS and its partners launched a version of the wind chill index in Canada and the United States. The new formula for calculating the index uses advances in science, technology, and computer modeling to provide a more accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing

temperatures. Clinical trials were conducted at the Defence and Civil Institute of Environmental Medicine in Toronto, and the trial results were used to improve the accuracy of the new formula and determine frostbite threshold values. Standardizing the index among the meteorological community provides an accurate and consistent measure to ensure public safety.

NEXRAD Network Upgraded

In July 2002, ahead of schedule, NWS completed a significant upgrade to the Nation's Next-Generation Radar (NEXRAD). The Open Radar Product Generator (ORPG) processes the raw data, creates radar images and products, and sends those products to the ultimate users, such as the Advanced Weather Interactive Processing System (AWIPS). The upgrade provides hardware needed to extend tornado warning lead time; includes enhanced full-resolution radar data products for better detecting storm intensity; and provides a high-speed communications link to AWIPS. The upgrade has shown immediate improvement in warning lead time for small tornadoes in Iowa and Missouri that might not have been

detected with previous products. ORPG, in conjunction with additional planned technology improvements in the radar signal (Open Radar Data Acquisition/ORDA), will help NWS achieve its goal of 15-minute average tornado warning lead times in FY 2007, up from 11 minutes in FY 2002.

Five-Day Flood Outlook Begun

A new five-day flood outlook that identifies areas at risk of significant river flooding became an official NWS product on November 1, 2001. The 13 NWS regional River Forecast Centers developed and tested the product and solicited feedback from partners and customers. The outlook is available to the public with a graphical display on the Internet at www.hcp.ncep.noaa.gov/nationalfloodoutlook/. An additional map showing flood potential for the contiguous 48 states is available through the Emergency Managers Weather Information Network, NOAA Port, the Family of Services, and the NOAA Web site.

NWS Revamps Internet Sites

NWS received hundreds of customer comments while updating the navigation and design of



NWS headquarters meteorologist Christine Alex answers a question about NOAA Weather Radio at the National Association of Broadcasters' annual convention in April 2002. Photo: Herb White, National Weather Service

more than 200 NWS Web sites (www.nws.noaa.gov), which debuted in March 2002. The purpose of this revamping effort was to provide the public easier access to the huge number of NWS products and services, with a strong emphasis on the rapid dissemination of watches, warnings, and advisories. A number of significant technical issues regarding Web browser compatibility, load speeds, and information accessibility were raised in public comments and incorporated in the final design. On an average day, 2 million unique users visit the NWS Web pages; in a severe weather situation, such as a landfalling hurricane, the Web pages have received as many as 8 million visits a day.

Emergency Information Network Installed for Pacific Region

Real-time weather data, tsunami bulletins, earthquake messages, and other natural disaster products are now available at all NWS Pacific Region offices, including those outside the GOES-10 satellite footprint. Recently completed installations in Guam, the Federated States of Micronesia, and the Republic of Palau bring the total number of Emergency Managers

A significant upgrade to the Nation's Next-Generation Radar (NEXRAD) provides hardware needed to extend tornado warning lead time and includes enhanced full-resolution radar data products for better detecting storm intensity.



Weather Information Network (EMWIN) stations in the Pacific to 28. EMWIN is a suite of data-access methods that makes available a live stream of weather and other critical emergency information to meteorological and emergency management personnel via satellite. Since communications can be unreliable in Pacific island countries,



NWS Director Jack Kelly, left, and 2002 Winter Olympics Salt Lake City Organizing Committee Chief Mitt Romney speak at a news conference about the unique public/academic/private partnership established for providing weather forecasts for the games. Photo: Curtis Carey, NOAA Office of Public Affairs



Don Turner, Regional Maintenance Specialist from the NWS Weather Forecast Office in Cheyenne, Wyoming, checks a Crown transmitter for a new 1000-Watt NOAA Weather Radio station KHA-55 near Oshkosh, Nebraska. The station resulted from a U.S. Department of Agriculture Rural Utilities Service grant and the work of several partners in the community, including Wheatbelt Public Power District, Pinpoint Communications, and Nebraska Region 21 Emergency Management. Photo: Bryan Yenni

EMWIN serves as a valuable backup tool and, in some locations, may be the only reliable source of severe weather warnings.

Partners Provide Weather Support for Olympics

In February 2002 more than one million spectators and thousands of athletes, officials, and local residents converged on Utah's Wasatch Front Mountains and the greater Salt Lake City area for the 2002 Winter Olympics. A unique partnership between NWS, the University of Utah, and 13 private meteorologists under contract to KSL-TV provided forecasts for the Winter Games. NWS provided the baseline meteorological information through routine NWS products and services for public safety, emergency operations, traffic, security, aviation, and avalanche control. A personal computer-based weather display system and weather communication network called FX-Net, and developed by NOAA's Research Forecast Systems Laboratory, ensured all forecasters had access to the same weather information to provide forecasts for the events. The private meteorologists provided official weather forecasts at the five outdoor venues. The University of Utah's Department of Meteorology maintained 27 weather sensors at key locations throughout northern Utah, and ran high-resolution analysis models every hour for northern Utah, as well as high-resolution computer forecast models four times a day to support the joint Olympic forecasting effort.

Heat Index Forecasts Highlight Potential Dangers

Heat waves often turn fatal when nighttime temperatures do not drop enough to provide relief from the day's heat. In May 2002, NWS started distributing probabilistic Mean Heat Index forecasts that fac-

tor in the dangerous effects of prolonged heat stress. These new forecasts give health and emergency officials up to seven days of advanced warning of when a prolonged period of dangerous heat is approaching. These forecasts replace the more general three- to seven-day Heat Index forecasts, which, similar to the Wind Chill Index for cold, considered the relative humidity and the actual air temperature to arrive at a value describing how hot it really feels, but did not sufficiently account for the range of highs and lows for a given day. The Mean Heat Index forecasts are calculated for 90 cities across the continental United States.

Climate and Weather Supercomputer Capabilities Upgraded

On May 31, 2002, NOAA awarded a nine-year, \$224.4 million contract to International Business Machines (IBM) for the lease of a new supercomputer. The system's installation will allow NWS's National Centers for Environmental Prediction to run more sophisticated models of the atmosphere and oceans to improve weather, flood, ocean, and climate forecasts. Over the first three years of the contract, the new IBM supercomputer will provide an average of 4.9 times the computational power of the current system. Over the life of the contract, the supercomputer will undergo incremental upgrades, reaching 48 times the computational power of the current computer by October 2009. Integration of the supercomputer into routine operations was scheduled to begin in the spring of 2003.

NWS Completes Hurricane Mitch Assistance to Central America

The NWS International Activities Office closed out the Hurricane Mitch project in December 2001. Following the October 1998 deadly



storm, NWS received \$7.8 million through a 2.5-year Department of Commerce/U.S. Agency for International Development agreement, to assist Central America in strengthening its hydrologic and meteorological services and building up extreme weather early warning systems. More than 10,000 people died as floods and mudslides ravaged Central America, and in some locations total rainfall exceeded 65 inches in three days. Since flooding is the main natural hazard in Central America, NWS focused its technology transfer, technical assistance, and training on river basins. NWS established a river forecast system for five major river basins (one transnational river basin) and early-warning flood ALERT (Automated Local Evaluation in Real Time) systems

on smaller flash flood-prone river basins. Automated rain gauges at 25 locations, as well as a few stream gauges, were installed (the U.S. Geological Survey installed other stream gauges). And NWS installed 20 automatic weather stations, five each in Guatemala, Honduras, Nicaragua, and El Salvador, as well as an upper-air observing system in Honduras. Using NOAA contractors, NWS also improved data communications by installing local area networks, voice radio networks, and repeater stations and by extensively using the Internet for distributing data and forecast products.

Real-Time Weather Radar Delivered to Air Traffic Controllers

On May 20, 2002, air traffic controllers in Fort Worth, Texas, received high-resolution informa-

Blacksburg, Virginia, Warning Coordination Meteorologist Mike Emlaw, right, explains NWS performance goals to Pulaski County, Virginia, Emergency Manager Stan Crigger. All NWS offices display the agency's performance measures similarly. Photo: Marc Kagan, NOAA

tion from the Federal Aviation Administration (FAA)/NWS weather radar network on their radar displays for the first time, along with normal aircraft positional data. NWS worked extensively with the FAA's Weather and Radar Processor (WARP) team to deliver the new capability, which reached initial operational status at the FAA's Air Route Traffic Control Center (ARTCC) in Fort Worth. The real-time radar data allow controllers to more accurately route air traffic around thunderstorms. The FAA installed the system upgrade to the remaining 20 ARTCCs during the rest of 2002 and early 2003.

NWS Upgrades AWIPS Server

Local NWS forecasters began receiving more timely forecast guidance in June 2002, thanks to a server upgrade that dramatically accelerated the delivery of data from the NWS supercomputer's forecast model to AWIPS. Before the upgrade, the average time required for production and delivery of model data was 20 minutes; the upgrade reduced the average delay to 8 minutes.

Environmentally Friendly Forecast Office Opens in Maine

On July 2, 2002, NWS opened a new Weather Forecast Office (WFO) in Caribou, Maine. The new state-of-the-art facility features many environmentally friendly features, including a geothermal

heating and cooling system, many windows for natural light, and many recycled building materials. The Caribou WFO is one of only a handful of buildings in the country to be recognized as a high-performance building by the U.S. Green Building Council's Leadership in Energy and Environmental Design program.

Phase I AWIPS Linux Migration

In FY 2002 NWS continued Phase I of its Linux Migration plan. Two Linux-based computers were deployed to each AWIPS, and a communications processor was replaced with a Linux server. The effect of these changes was benchmarked in an automated test. These improvements provided needed headroom for functionality and new data sets added in AWIPS Build 5. The net effect—Linux Phase I with new functionality—

was 28 percent improvement in throughput and 35 percent improvement in CPU utilization. Functionality included: better responsiveness of warning decision tools, such as the System for Convective Analysis and Nowcasting; ingestion and processing of higher-resolution radar data and several satellite products; and improved work station performance for graphical forecast editing to support the transition to the digital forecast paradigm. Because new data sets have such an impact on processing and performance, continued migration of AWIPS components to higher-performing processors will be required.

California Radar Gets First Solar Power System

A new solar panel system at the Doppler weather radar facility in San Diego (Miramar), California, is

A technician cleans ice from a North Huron Great Lake buoy station, 37 nautical miles northeast of Alpena, Michigan. Photo: Lynn Hine



PRODUCTS AND SERVICES

Next-Generation Radar (NEXRAD)

NWS forecasters use NEXRAD to detect and acquire information about tornados, severe thunderstorms (containing damaging winds, hail, turbulence, and lighting), and heavy precipitation (leading to flash flooding and heavy snow). NEXRAD is a tri-agency program of NWS, the Federal Aviation Administration (FAA), and the U.S. Air Force (USAF).

Automated Surface-Observing System (ASOS)

Getting more information on the atmosphere, more frequently, and from more locations is the key to improving forecasts and warnings. ASOS, the Nation's primary surface weather-observing network, observes, formats, archives, and transmits observations automatically. ASOS systems are designed to support weather forecast activities and aviation operations and, at the same time, support the needs of the meteorological, hydrological, and climatological research communities. ASOS routinely and automatically provides computer-generated voice observations directly to aircraft in the vicinity of airports, using FAA ground-to-air radio. These messages are also available via a telephone dial-in port. ASOS transmits special reports when conditions exceed preselected weather elements thresholds. The ASOS program is a joint effort of NWS, the FAA, and the Department of Defense.

the first of this type of solar array system installed on an NWS radar facility and the first photovoltaic radar system in the country. Jointly funded by the U.S. Department of Energy, the California Energy Commission, and NOAA, the new system is capable of providing up to one-third of the maximum electrical capacity required by the radar. And because the solar power would reduce the need for fossil fuel-generated electricity, the Environmental Protection Agency estimates the unit will reduce carbon dioxide emissions by 30,000 to 60,000 pounds per year. When the San Diego Weather Forecast Office first placed the radar on stand-by, the meter ran backwards and generated power back to the utility. A rough estimate predicts the unit will pay for itself within 33 years if energy costs remain the same; if rates increase, the payoff could

occur much sooner. NOAA expects to recoup its portion of the investment in the system in about six years. The solar panels require virtually no maintenance. The San Diego electronics staff simply washes them once a month to maintain peak efficiency.

FUTURE OUTLOOK

In a world of rapidly expanding technology, scientific capabilities, and expectations, NWS faces the challenge of providing weather data and information to citizens, public officials, and private companies when and where they want it, in a form they can easily understand. To achieve this goal, NWS will obtain and use more data and will increase its computer power at its local offices and national centers to provide more accurate, frequent,

time- and space-specific data and information than ever before. As NWS makes more of its data and information available in digital form, conversion into text, graphics, or other forms will be easier for NWS and others.

IBM SP Supercomputer

The IBM SP supercomputer runs complex numerical weather models that generate products that NWS and private-sector meteorologists use as the basis for their forecasts. The supercomputer's added capabilities and speed allow forecasters to predict extreme weather several days in advance.

Advanced Weather Interactive Processing System (AWIPS)

AWIPS is the central nervous system of NWS forecast operations and the information technology network that carries observations, data, and forecast models to NWS forecasters. With AWIPS, forecasters integrate and exploit all the data from the observing systems and numerical weather prediction models onto one platform. AWIPS enables rapid diagnosis of weather systems and the generation of timely, accurate warnings of severe weather.

National Data Buoy Center (NDBC)

The NDBC is the focal point for data buoy and associated automated meteorological monitoring system technology. It provides operational, marine data from about 70 moored buoy stations in the Atlantic, Pacific, Gulf of Mexico, and the Great Lakes, and operates about 60 C-MAN (Coastal-Marine Automated Network) stations.

NWS Telecommunications Gateway (NWSTG)

NWSTG is the Nation's telecommunication hub for collection, processing, and distributing weather data and information. This telecommunications center provides national and global data exchange services using automated communication resources, transmitting a wide variety of environmental data. NWSTG operates around-the-clock to acquire and process observations; construct messages; and disseminate messages and files of observations, analysis, and forecast products. Customers worldwide use data processed by NWSTG, affecting a wide range of economic and emergency management decisions.

NOAA Weather Radio (NWR)

The NWR network has more than 750 transmitters, covering the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. Working with the Federal Communications Commission's Emergency Alert System, NWR is the single source for the most comprehensive weather and emergency information available to the public. NWR also broadcasts warning and post-event information for all types of hazards—both natural (such as earthquake and volcano activity) and environmental (such as chemical releases or oil spills).

National Environmental Satellite, Data and Information Service

The Nation's Eye on the Environment



Gregory W. Withee
Assistant Administrator

As the operator of the Nation's civil operational, environmental satellite system, the National Environmental Satellite, Data and Information Service (NESDIS) observes our Earth, our oceans, and our atmosphere every day and uses these observations to benefit all people and sectors of society. Composed of the Geostationary Operational Environmental Satellites (GOES) and the Polar-orbiting Operational Environmental Satellites (POES), the system provides

the U.S. space-based component of a global environmental monitoring system. On behalf of the Department of Defense, NESDIS also operates the Defense Meteorological Satellite Program spacecraft. And on behalf of the Department of Commerce, NESDIS licenses the operation of commercial remote-sensing space systems.

NESDIS manages the largest collection of atmospheric, geophysical, and oceanographic data in the world. The agency contributes to the national economy by providing environmental data for energy distribution, the development of global food supplies, and the management of natural resources. NESDIS also provides data and information to a broad spectrum of users—for example, NOAA forecasters issuing severe storm warnings, researchers studying the environment, and national and international space agencies.

ACCOMPLISHMENTS

GOES Images Provide Severe Weather Warning

Hours in advance of one of the worst tornado outbreaks on record (November 10, 2002), NESDIS scientists changed the data output from NOAA's GOES to produce more frequent images of a potential severe storm area. NOAA forecasters used the imagery updates to issue accurate tornado watches in advance of massive thunderstorms that spawned approximately 88 twisters. The NOAA satellite imagery on local television weather forecasts helped save lives by showing the developing

thunderstorms with tornadic potential. One timely tornado warning on NOAA Weather Radio in Van Wert, Ohio, helped a movie theater manager make the timely decision to move about 50 patrons into a safe hallway just before the tornado smashed through, dropping automobiles onto the theater's seats.

Heading Toward a New Generation of Polar Satellites

In August 2002, NESDIS awarded a \$4.5-billion contract to TRW, Inc., for the acquisitions and operations phases of the National Polar-orbiting Operational Environmental Satellite System. This system

combines the Nation's military and civilian environmental satellite programs into a single national system that will significantly improve weather forecasting, environmental monitoring, and climate prediction.

Continental Drought Monitoring Initiated

An April 2002 workshop at NOAA's National Climate Data Center in Asheville, North Carolina, ushered in a new era of continental-scale drought monitoring. NOAA scientists and Canadian and Mexican drought experts formed a three-nation team that will annually assess drought conditions in North America. The team's scientists plan to continue experimental monthly drought monitoring, with the goal



of transitioning to an operational, North American drought monitor map publicly available via the Internet.

Hurricane Hunters Capture Real-time Images

NESDIS enhanced NOAA hurricane research aircraft in 2002 by making real-time images from GOES available on board the planes while in flight. By squeezing the large volume of imagery data into a form that can be transmitted through existing aircraft communication links, NESDIS scientists established a foundation to make GOES data routinely available, which is especially valuable during critical hurricane missions.

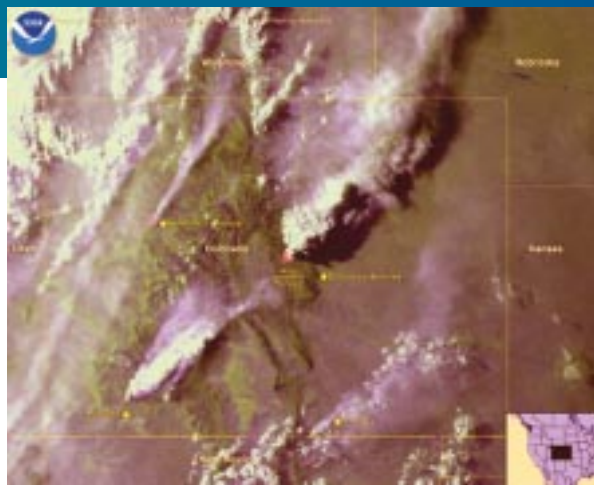
Milestone Reached for Life-Saving Satellite Program

During FY 2002, the Cospas-Sarsat satellite-based search-and-rescue program marked its 20th anniversary. The program is operated in the United States by NOAA, the U.S. Coast Guard, the U.S. Air Force, and the National Aeronautics and

Space Administration (NASA). NOAA also collaborated with the Air Force during FY 2002 to establish points of contact in Central America to receive NOAA satellite search-and-rescue distress alerts. The contacts were established in Panama, Ecuador, and Honduras (on behalf of Belize, Guatemala, El Salvador, Nicaragua, and Costa Rica). Since the system's inception in 1982, more than 14,000 people have been rescued worldwide.

NOAA Assists Humanitarian Relief Effort in Afghanistan

At the request of the U.S. State Department, NOAA has been disseminating environmental information to assist the humanitarian relief effort in Afghanistan. NESDIS posted a special snow-cover map derived from data provided by NOAA polar-orbiting



In June, NESDIS provided fire managers and state officials with extra-detailed, 24/7 satellite imagery to help fight the Hayman fire—the largest fire in Colorado's history. Image: NESDIS

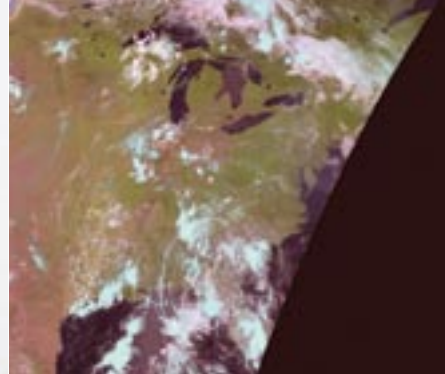
satellites. And with assistance from the U.S. Air Force and U.S. Navy, NESDIS developed an interactive map describing the climatology of Afghanistan and surrounding countries.

Wildfires Detected from NOAA Satellites

Due to severe drought conditions throughout much of the United States and Canada, 2002 turned out to be a year of extensive wildfires. Fire weather forecasters used NESDIS' wildfire Automated Biomass Burning Algorithm (ABBA) to mitigate this hazard. The ABBA detects fires using observations from NOAA's GOES satellites. In 2002, NESDIS scientists improved this tool to reduce false detections. As a result, fire managers and state officials now have accurate, high-resolution information of fire locations from NOAA satellite imagery 24 hours a day, 7 days a week. In June, Colorado experienced the largest fire in the state's history, the Hayman fire. NESDIS responded by activating the satellite-observation capabilities best suited for fire detection, and

NOAA forecasters use NESDIS satellite imagery updates to issue accurate tornado watches in advance of massive thunderstorms that spawn devastating twisters. Photo: Joe Golden, National Weather Service





On June 24, 2002, a Titan II rocket carrying the NOAA-17 satellite blasted off from California's Vandenberg Air Force Base. This view of the Great Lakes was among the myriad images NOAA-17 has captured on its journey. Photo: Mark Powell, Custom Image Photography

by providing extra detailed imagery through the on-line Operational Significant Event Imagery program.

New Polar Satellite Successfully Launched

On June 24, 2002, NESDIS launched NOAA-17, the third of the current series of POES. This latest launch provides improved imaging and sounding capabilities that will contribute to climate change

knowledge and the President's climate change research initiatives.

Climate Reference Network Expands

The number of Climate Reference Network stations in operation nearly tripled during the past year. Among the new stations were the first two deployed in Alaska, at Fairbanks and Point Barrow. When complete, the network will reduce scientific uncertainties in temperature and precipitation measurements nationally by providing highly accurate, consistent environmental measurements.

Coastal Data Development Center Opens

On April 8, 2002, the National Coastal Data Development Center (NCDDC) opened to the public at Mississippi's Stennis Space Center. NCDDC has a mandate to provide unique access to coastal data, along with archiving capabilities. One of its major efforts is the Gulf of Mexico Habitat Pilot Project, which is designed to improve

PRODUCTS AND SERVICES

Weather and Climate Ocean Observation

NESDIS satellites provide a robust, integrated, comprehensive satellite observing system that protects the Nation and its economic infrastructure from the threats of severe weather, extreme environmental events, and unusual climate and its often devastating impacts. The global, continuous, environmental observations that NESDIS satellites provide drive weather- and climate-forecasting models. NESDIS observations also contribute to the preservation of marine and coastal habitats, safeguard navigation and transportation, and provide search-and-rescue capability.

Polar-orbiting Satellite System

The NESDIS Polar-orbiting Operational Environmental Satellite (POES) system provides an uninterrupted flow of critical global information used in numerical weather models. Continuous global temperature and humidity values from the POES system provide critical inputs for quality three- to five-day and long-range temperatures, precipitation, and snow forecasts. The POES system also monitors global sea-surface temperatures, indicating the location, onset, and severity of such events as El Niño as early as possible. Longer lead times of these impending events allow emergency and agricultural managers to activate plans to reduce the impact of floods, landslides, and droughts.

The U.S. government has traditionally maintained two polar weather satellite systems, one for civil purposes and one for military purposes. In 1994, a Presidential Decision Directive created the National Polar-orbiting Operational Environmental Satellite System (NPOESS) to converge these systems. As implemented under the Presidential Decision Directive, NPOESS will save \$1.6 billion over the life of the program, compared to the cost of continuing and upgrading the current series of POES and Defense Meteorological Satellite Program satellites. Administered by the Departments of Commerce and Defense and the National Aeronautics and Space Administration, NPOESS will provide an improved, cost-effective, single national system capable of satisfying both civil and national security requirements for real-time, space-based, remotely sensed environmental data.

Advanced NPOESS sensors will deliver higher-resolution atmospheric, oceanic, and terrestrial data, enabling more accurate short-term weather forecasts and severe storm warnings. NPOESS also offers the added advantage of serving the longer-term, data-continuity requirements of the climate community for improved global climate assessment and prediction. NPOESS will also provide improved measurements and information about the space environment necessary to ensure

NOAA Fisheries' capability to access and map fish habitat data in the Gulf of Mexico, and to expand to other regions nationally once the habitat project becomes operational. To augment this project, NCDDC has developed a habitat Web site for coastal resource managers, scientists, educators, nongovernmental organizations, and students. The site will provide access to Gulf of Mexico fishery and habitat data for use in ecosystem-based fishery science and management, and for mapping fish habitat.

Climate Database Expanded

Over the last year, the Climate Database Modernization Program added 8 million records to Web, Search, Store, Retrieve, Display. This on-line system now holds more than 36 million climate records that include hourly and daily weather to upper air and ionospheric observations, as well as ice thickness reports.



Commercial Remote-Sensing Committee Established

NOAA's Advisory Committee on Commercial Remote Sensing (ACCRES) was established in September 2002. NOAA asked ACCRES to propose options for working with other U.S. agencies, along with foreign governments, to create a better business environment for U.S. commercial remote-sensing firms. The Advisory Committee has also been charged with exploring licensing provisions to enable Federal agencies to buy commercial data, and effectively

The National Climate Data Center, the world's largest source of climate data, archives billions of meteorological observations and responds to more than a million requests a year. Photo: Leslie Tarter

integrate the data into civilian and military activities. ACCRES will also review processes that NOAA could employ to license new and increasingly advanced commercial dual-use technologies, which have significant military and intelligence applications. Also in 2002, NOAA granted one commercial remote-sensing license, approved eight license amendments, and approved six licensee foreign agreements valued at \$76 million.

reliable operations of space- and ground-based systems, as well as continue to provide surface data collection and search-and-rescue capabilities. The tri-agency NPOESS program is well along the path to creating a high-performance integrated polar satellite system that will cost less, be more responsive to user demand, and deliver higher capability than that available today.

Geostationary Satellite System

NESDIS operates a system of environmental satellites in geostationary orbits to provide data for short-term weather warnings and forecasts. Known as GOES, these satellites orbit the Earth at 22,600 miles above the equator. Two GOES satellites remain operational at all times—one providing coverage for the eastern United States and most of the Atlantic Ocean, and the other providing coverage for the western United States and the Pacific Ocean basin.

GOES satellites provide images of the entire United States every 15 minutes. NESDIS can also acquire GOES images as frequently as every minute to monitor the development of severe weather. The National Weather Service uses GOES temperature and water vapor data in powerful numerical prediction models to form the basis of local weather forecasts

and warnings of severe weather events. GOES images are also converted to videotape for use on national television weather shows.

Environmental Data and Information Services

The NOAA Data Centers provide worldwide environmental data and information products and services in the atmospheric, marine, solid Earth, and solar-terrestrial sciences to meet the needs of users in commerce, industry, agriculture, science, and engineering; the general public; and Federal, state, and local agencies. Environmental data and information maintained by NOAA are vital to every economic sector and are used in making decisions critical to: national defense; industrial productivity; energy development and distribution; world food supplies; public health, safety, and welfare; and development of natural resources. Environmental scientists and observers also have a critical need for long time-series of historical and recent global data to assess long-term environmental trends, to evaluate the current state of the environment, and to predict future environmental conditions and events. This need makes NOAA data archives a national treasure that our country must maintain.



From left: Rob Mairs, Jane D'Aguzzo, Greg Withee, Mary Glackin, and Warren Hall. Photo: Roberta McQuilkin

Coral Reef Information System Comes On Line

In September 2002, NOAA unveiled a new Internet site designed to be a single point of access for information on coral reefs, replacing an array of more than 50 agency Web sites. Known as CoRIS, the Coral Reef Information System provides data and information from agency programs and projects. By the end of November 2002, it had attracted more than 14,000 visitors.

NOAA Assists Japan with Satellite Coverage

On May 10, 2002, Vice Admiral Conrad C. Lautenbacher, Jr., signed an agreement to provide the Japan Meteorological Agency a backup for its ailing geostationary satellite. For the backup, NOAA restored one of its geostationary satellites (GOES-9) to operation that can provide data similar to that supplied by the failing Japanese satellite. The arrangement also establishes the groundwork for a separate long-term mutual backup agreement, which would enable the United States to call upon Japan if the circumstances were reversed.

FUTURE OUTLOOK

International events and technological progress have reshaped the global context in which NESDIS operates. Anticipating this rapid pace of change is vital to shaping NESDIS' vision for the future. Several factors—including future environmental observing capabilities, new information technology, and the growing needs and expectations of our numerous customers—will present opportunities for delivering improved products and services to meet future challenges.

Our national security, economy, and environment have become inextricably linked. No single environmental observing platform can fulfill all environmental remote-sensing requirements. Our customers need the best mix of observations from available and planned observing platforms and sensors. The upcoming expansion of advanced satellite instruments

National Geophysical Data Center

The National Geophysical Data Center (NGDC) in Boulder, Colorado, ingests, compiles, archives, and disseminates a wide variety of scientific data ranging from information about the interior of the Earth to solar activities. The NGDC maintains more than 500 unique databases that contain information on natural hazards, such as tsunamis, volcanoes, earthquakes, and phenomena in space; studies of Earth's magnetic and gravity fields; topography and ecosystems data; marine geology and geophysics data; glaciology; upper-atmosphere physics; and the space and solar environments.

The NGDC meets the needs of a diverse community of users, servicing more than 1.5 million requests a year. Data users include scientists; researchers; the private sector; Federal, state, and local governments; academia; and the public. The NGDC places particular emphasis on providing data to the Earth science research community to support ongoing work in global change, resource exploration, and basic science. The NGDC also operates World Data Centers for Solar-Terrestrial Physics, Marine Geology and Geophysics, Solid Earth Geophysics, and Paleoclimatology.

National Coastal Data Development Center

NESDIS recently established the National Coastal Data Development Center (NCDDC) at the Stennis Space Center in Mississippi, to archive and provide access to the long-term coastal data record. A wide variety of coastal users—such as coastal resource managers, the research community, coastal weather forecasters, and fisheries managers—have demanded that marine data be made more accessible to help our Nation acquire a better understanding of the health of our coastal environment. The NCDDC's goal is to improve the quality of, and accessibility to, marine data characteristics, such as chemistry, biology, and geology, and such physical parameters as water levels, bathymetry, winds, and waves.

Working with Federal, state, and local agencies, academic institutions, nonprofit organizations, and the private sector, the NCDDC will create a unified, long-term database of coastal data sets. It will also develop and maintain a catalog of available coastal data, ensure the quality of these data, and provide on-line access to the coastal user community. Additionally, the NCDDC will produce retrospective analyses and trend information to help form the basis for environmental assessment and public policy.

and data from such systems as the National Polar-orbiting Operational Environmental Satellite System and the European polar meteorological satellite program is a daunting challenge, as we move toward the production of significantly better forecasts from numerical weather-prediction models.

In this new century, the challenge of NESDIS is to use operational satellite-observing systems comprehensively so as to extract the best-quality products possible as we plan for observing systems that serve both weather and climate system needs. We must also realize the full potential of current and future satellite- and ground-based data, and provide timely environmental data relevant to current and future economic and environmental issues on local, regional, national, and global scales.

To be the source for the most comprehensive and easily accessible satellite products, data, and



environmental information and assessments in the world, NESDIS will continue to operate and develop the world's premier environmental satellite systems, leading efforts with other agencies and countries to establish a global observing system to meet the world's weather, climate, ocean, and hazards support information needs. NESDIS will also implement new technologies to archive and provide access to massive volumes of new data becoming available that describe

Admiral Lautenbacher and Shuichiro Yamanouchi, President of the National Space Development Agency of Japan, congratulate each other on an agreement to provide Japan a backup for an ailing geostationary satellite.

our climate, fulfilling growing customer requirements for quality and timely state-of-the art products and services. Those technologies include synthetic aperture radar, hyperspectral imaging, and the laser-based LIDAR (Light Detection And Ranging) system.

National Oceanographic Data Center

The National Oceanographic Data Center (NODC) maintains the world's largest collection of publicly available oceanographic information, including hundreds of millions of records gathered from ocean observation programs conducted over the past 150 years. These data document the physical and chemical properties of the oceans, currents, weather, and biota as observed from ships, buoys, and satellites.

Every year, more than 270,000 ocean researchers, environmental program managers, educators, maritime industry officials, and NOAA scientists use NODC products and topic sets, including the Marine Environmental Buoy Database, the Atlas of Surface Marine Data, and the World Ocean Circulation Experiment Data Set.

The NODC also operates the NOAA Library and Information System, which consists of the NOAA Central Library in Silver Spring, Maryland, and the Seattle and Miami Regional Libraries. The NOAA library data collection consists of more than 1.7 million volumes and thousands of visual images on topics related to NOAA's diverse missions. Access to the library collection and information services is available through the World Wide Web, which routinely handles more than 250,000 queries a month.

National Climatic Data Center

The National Climate Data Center (NCDC), the world's largest source of climate data, archives billions of meteorological observations and responds to more than one million requests a year. NCDC receives, processes, archives, and disseminates surface, marine, upper-air, radar, and solar-radiation data and environmental observations.

NCDC makes environmental data and information available both in an on-line, immediate Internet-access basis and in off-line products delivery. Users include climate researchers, engineers, agribusiness, emergency planners, attorneys, government agencies, and the public. Economic sectors benefiting from NCDC data include energy development and conservation, power production, food production, human health, construction, air pollution control, and transportation. NCDC also performs climatic applications studies for other Federal agencies, including the National Aeronautics and Space Administration, the Environmental Protection Agency, and the Departments of Defense and Energy.

NOAA Marine & Aviation Operations

On the Sea and in the Air



Rear Adm. Evelyn Fields, NOAA
Director

NOAA Marine and Aviation Operations

(NMAO) manages, operates, and maintains the Nation's largest civil fleet of research and survey ships and aircraft to collect data for NOAA's environmental stewardship assessment and prediction programs. NMAO also administers NOAA's Diving Program and the NOAA Commissioned Corps.

NOAA ships support a wide range of ocean and atmospheric activities, including fisheries and coastal research, nautical charting, and long-range ocean and climate studies. The ships are specially equipped and designed to support NOAA programs, and have data collection capabilities not found in the commercial fleet. For example, NOAA fisheries survey vessels can conduct joint operations of fishery stock assessments and oceanography, giving scientists a complete picture of a fish species, its habitat, and its surrounding environment.

NOAA aircraft operate throughout the Nation, collecting data for programs ranging from hurricane prediction research, to snowpack surveys for flood prediction and water resource management, to coastline mapping for erosion studies, to marine mammal surveys. NOAA's aircraft are modified to carry instruments needed for NOAA missions, and are unique in their ability to support atmospheric and hurricane surveillance and research programs.

NOAA Corps Officers operate, manage, and maintain NOAA ships and aircraft and bring their operational expertise to land-based assignments. They work in locations as diverse as the South Pole and Australia, carry out NOAA Chief Scientist duties on NOAA's hydrographic survey ships, and serve in management and technical positions throughout all of NOAA's Line Offices.

ACCOMPLISHMENTS

Security of the NOAA Fleet Evaluated

Following September 11, 2001, NMAO initiated an independent security review of its ships and aircraft to identify potential vulnerabilities and appropriate measures for ensuring the safety and security of the NOAA fleet. The review focused on four key areas: the fleet security management system, the physical security of individual platforms (including electronic countermeasures), human resource practices (including hiring practices and security awareness), and crisis management.

Diving Program's Numbers on the Rise

During FY 2002, the NOAA Diving Program's active NOAA divers rose by 6 percent to 396 divers, and the number of dives performed in support of NOAA's mission jumped by 15 percent to 15,058.

New NOAA Corps Officers Join the Ranks

NMAO graduated two new Basic Officer Training Classes in FY 2002. The new ensigns bring the total number of NOAA Corps Officers to 254.

During FY 2002, the number of dives performed in support of NOAA's mission jumped by 15 percent to 15,058. Photo: NOAA Marine and Aviation Operations



Safety Guidance Developed for NOAA's Small Boats

While NMAO is responsible for the safe management and operation of NOAA's fleet of large vessels, the overall responsibility for the safe operation of more than 100 NOAA motorboats and small research vessels is vested within individual NOAA Line Offices. To ensure a culture of safe and environmentally sound small-boat operations, NMAO has developed guidance in the form of a NOAA Administrative Order for the routine inspection and safe operation of NOAA's small boats. Line Offices are already voluntarily complying with the draft guidance in anticipation of its formal clearance.

Homeland Security Support Continues

More than a year after the attacks on the World Trade Center and Pentagon, NOAA platforms continue to support the Nation's homeland security efforts. In Tampa, Florida, a NOAA Bell 212 helicopter flies routine security flights over MacDill Air Force Base—the home of both the Central Command for the war on terrorism and NOAA's



During FY 2002, NMAO aircraft logged nearly 3,003 flight hours in support of NOAA's varied missions. Photo: NOAA Marine and Aviation Operations

Aircraft Operations Center. Also, to strengthen the Nation's preparedness for homeland security, NOAA's hydrographic survey vessels are providing the U.S. Navy with 100 percent bottom-coverage route surveys in major shipping corridors.

Outsourcing Supports Data Collection

NMAO employs a mix of NOAA platforms and outside resources to collect vital information about the Earth's atmosphere, oceans, and coasts. During FY 2002, NMAO

aircraft logged nearly 3,003 flight hours, and NMAO ships logged 3,636 operating days in support of NOAA's varied missions, including climate change research, nautical charting, flood forecasting, fisheries management, and ocean exploration. NMAO used contractors to meet 28 percent of NOAA's aircraft needs (1,142 flight hours) and 56 percent of NOAA's ship needs (4,613 ship operating days—not including contracts for hydrographic survey data).

Ten-Year Fleet Plan Developed

NMAO has developed a draft 10-year fleet plan for ship operations, and is developing a similar plan for aircraft services. In addition to describing core mission requirements supported by the NOAA fleet, contractor-supported activities, and vessel service life, the plan contains recommendations for addressing



NMAO graduated two new Basic Officer Training Classes in FY 2002. The new ensigns bring the total number of NOAA Corps Officers to 254. Photo: NOAA Marine and Aviation Operations



NMAO operates, manages, and maintains NOAA ships and aircraft, including the RONALD H. BROWN, NOAA's largest research vessel.
Photo: NOAA Marine and Aviation Operations

future ship time requirements and maximizing the efficiency of ship operations. Both the vessel and the aircraft plans will serve as guides for future policy decisions regarding the NOAA fleet.

NMAO Reaches Out to Students and the Public

NOAA's platforms and commissioned officers continue to attract broad interest from students and the public. During 2002, NMAO participated in dozens of air shows, open houses, and school visits. Despite added security measures in place since September 11, 2001, NMAO's tradition of inviting the

public to tour its ships and aircraft continues. NMAO also supported K-12 education by adopting local schools, including Shepard Elementary School in Washington, D.C.; Ballard High School's Maritime Academy in Seattle, Washington; and the David Starr Jordan School in La Jolla, California.

New Species Named after NOAA Ship

NOAA's fishery survey vessel *DELAWARE II* received a special honor for making significant contributions to the pursuit of fisheries science. An unknown species of fish collected during a Deepwater Systematics cruise has been officially named *Pseudos delawarei*, after the survey vessel. *DELAWARE II* conducts fishery and living marine resource research in support of the NOAA Fisheries Northeast Fisheries Science Center Laboratory in Woods Hole, Massachusetts.

Administrative Orders for Aircraft Updated

NMAO has prepared a new draft administrative order that updates and consolidates two former administrative orders for NOAA

Lt. Cmdr. Mike Gallagher, NOAA Corps, determines the best position for placing a Global Positioning System receiver on the Golden Gate Bridge. Photo: NOAA Marine and Aviation Operations

aircraft. "Management and Utilization of Aircraft" requires NOAA's Line Offices to prioritize their requests for NOAA aircraft time before submitting them to the NOAA Aircraft Allocation Council, and specifies procedures for the use of commercial aircraft services.

Fleet Modernization Efforts Progress

In FY 2002, NMAO continued to make progress in modernizing the NOAA fleet. After nearly 40 years of service in the Pacific, the *TOWNSEND CROMWELL* will



PRODUCTS AND SERVICES

Outsourcing Support

NMAO provides guidance and staff support to NOAA programs interested in obtaining chartered platforms. NMAO recommends chartering options to NOAA programs and ensures the platforms are safe and outfitted to meet program requirements.

Data Collection

NOAA ships and aircraft have sophisticated data collection capabilities, such as Doppler radar on the *RONALD H. BROWN* and WP-3D Orion hurricane research aircraft. Each ship is equipped with an NMAO-developed Scientific Computer System, which integrates data from shipboard

and deployed sensors into one central system, enabling scientists to make research decisions based on real-time data access and visualization. The Fisheries Scientific Computer System addresses the specific needs of fisheries data collection. Additionally, NMAO developed the Internet at Sea program, which enables ships at sea to connect to the Internet and transmit to the scientific community and the public research data, real-time images of ship personnel and scientists at work, and other valuable products and services.

NOAA Diving Program

The NOAA Diving Program oversees and manages NOAA diving personnel, equipment, and activities to ensure that all diving operations are performed safely and efficiently. The program provides beginner and specialty dive training

be replaced in FY 2003 by the *OSCAR ELTON SETTE*, a converted T-AGOS vessel. Also in FY 2003, a former Navy vessel will be renamed the *NANCY FOSTER*, after the late Assistant Administrator of the National Ocean and Service, and will replace the coastal research vessel *FERREL*. Other future additions include a newly constructed fishery survey vessel and a small waterplane area twin hull (SWATH) vessel, reactivation of the hydrographic survey ship *FAIRWEATHER*, and a ship for coral reef mapping and research in the Northwest Hawaiian Islands.

FUTURE OUTLOOK

As emerging mission requirements, such as homeland security, ocean exploration, and habitat mapping, increase the demand for ship and aircraft data acquisition in the future, NMAO will face the challenges of providing capable platforms, up-to-date technology, and highly skilled personnel. NMAO will continue to seek the most effective mix of in-house and out-sourced platform support to meet NOAA's needs, while working to improve the efficiency of existing NOAA platforms, modernize or

replace aging platforms, recruit and retain a technically competent workforce, and provide the guidance and support needed for safe NOAA small boat operations.

A tugboat pulls a former Navy YTT vessel into the shipyard for conversion to a NOAA coastal research ship, to be named the NANCY FOSTER. Photo: NOAA Marine and Aviation Operations



NOAA Corps Ensigns John Lomnický and Misty Watson in Basic Officer Training Class 103 get experience operating a U.S. Merchant Marine Academy boat. Photo: NOAA Marine and Aviation Operations



to NOAA employees and outside agencies, including the Federal Bureau of Investigation, the Environmental Protection Agency, the U.S. Secret Service, the U.S. Fish and Wildlife Service, and local law enforcement.

NOAA Corps

NOAA's Commissioned Corps operates, manages, and maintains NOAA ships and aircraft, and brings its operational expertise to land-based NOAA programs through rotational assignments. Officers work under a military-style personnel system, giving them the flexibility to move rapidly into disaster-response situations, such as locating the downed aircraft of John F. Kennedy, Jr.; TWA Flight 800; and, most recently, flying remote-sensing missions over the collapsed World Trade Center.

Teacher at Sea Program

NMAO administers the Teacher at Sea program, which is sponsored through NOAA's Office of Global Programs. Now in its eleventh year, the program has enabled more than 325 educators to gain hands-on research experience at sea. College professors and K–12 teachers who have been selected to the program spend a cruise aboard NOAA hydrographic, oceanographic, and fisheries survey vessels. Living and working side-by-side with scientists and crew provides the teachers with a depth of understanding that enriches their classroom curricula. Teachers have taken advantage of the Internet to communicate their experiences to students back home through the ships' Internet at Sea capabilities.

NOAA Finance and Administration

Serving NOAA So NOAA Can Serve America



*Sonya G. Stewart
Chief Financial Officer/
Chief Administrative Officer*

NOAA Finance and Administration

(NFA) provides the critical services that support NOAA's strategic mission to describe and predict changes in the Earth's environment and to conserve and wisely manage the Nation's coastal and marine resources. Specifically, NFA provides the administrative, financial, and infrastructure services that are essential to NOAA's mission.

NFA also provides financial and administrative services to non-NOAA entities, including many Department of Commerce facilities in the field. This support is provided by headquarters offices in the Washington, D.C., metropolitan area and the four regional Administrative Support Centers (Seattle, Washington; Norfolk, Virginia; Kansas City, Missouri; and Boulder, Colorado).

ACCOMPLISHMENTS

Budget Database Created

During FY 2002, the NOAA Budget Office completed a two-year effort to convert NOAA's budget control table and entire budgetary submission to a database format, saving work years and improving the overall accountability, tracking, and flexibility for producing NOAA's Secretarial, OMB, and Congressional budget submissions.

Improved Turnaround for Congressional Inquiries

The NOAA Budget Office responded to over 700 requests for information from Congress, with an average turnaround of six business days.

Business Management Fund

The NOAA Budget Office moved forward with the design of the NOAA Business Management Fund, which will convert NOAA's service

operations from an assessment-based to an activity-based, fee-for-service methodology. The underpinning of this fund will be guided by an Activity-Based Cost Management contract, resulting in a wholesale conversion of corporate costs services.

Table of Organization Database Developed

During FY 2002, the NOAA Budget Office developed the Table of Organization database, which provides detailed and summary-level information on both authorized and actual personnel levels in both report and organizational chart formats. The system will provide NOAA with a single database to retrieve accurate, reliable, real-time information on the agency's workforce.

NOAA Business Operations Manual Planned

NOAA has contracted with the National Academy of Public Administration to create a Business Operations Manual. NOAA's task force review, directed by Vice

PRODUCTS AND SERVICES

Administrative Services

NFA provides a range of administrative services to all NOAA components (and many Department of Commerce offices in the field), including procurements, grants, human resources, administrative payments, administrative information technology systems, and facilities maintenance and construction.

Policies and Operating Programs

NFA develops required policies and support services and ensures that they meet the corporate requirements of

executive and oversight agencies, including the Office of Management and Budget, the Office of Personnel Management, the General Services Administration, and the Department of Commerce.

Budgetary Resources

NFA develops and manages the NOAA budget and related budgetary processes and policies, and prepares budget requests, analyses, full-justification budgets, and the President's Budget Summary. NFA also develops overall budgetary guidance, reviews proposals, and prepares sup-

Admiral Conrad C. Lautenbacher, Jr., recommended changes in NOAA's planning and budgeting processes that will strengthen the way NOAA budgets for its programs and will directly correlate senior management priorities, program performance, and accountability. The manual will enable NOAA managers and employees to navigate through the planning and budgeting processes, understand their interrelationships, and know the appropriate timing for a recommendation or decision point. The manual will also enhance understanding of the management decision-making system.



NOAA's Western Administrative Support Center is located at the Western Regional Center in Seattle, Washington.

NOAA Leadership Competencies Development Program

In FY 2002, NFA's Human Resources Management Office developed and instituted the NOAA Leadership Competencies Development Program. This program is now applied throughout NOAA to develop better leaders and improve management of the workforce within and across organizational lines.

E-Learning@NOAA Launched

To better meet critical employee and workforce development challenges, NFA's Human Resources Management Office launched a Web-based, 3-D, e-learning platform during FY 2002. In the three months since its implementation, access to this platform has increased access by NOAA's workforce from 10 to 20 percent of NOAA's workforce.

On-Line Job Opportunities Enhanced

During FY 2002, NFA's Human Resources Management Office worked with the Department of Commerce (DOC) to improve Commerce Opportunities On-Line (COOL), a Web-based, fully automated recruitment system. Since the system's inception, NOAA has accounted for over 58 percent of DOC's vacancy announcements.

Personnel Management Demonstration Project Expanded

NFA worked toward improving DOC's management of its workforce. Efforts are underway to expand the DOC Personnel Management Demonstration Project from 2,800 to its 5,000 employee cap.



NOAA's Eastern Administrative Support Center in Norfolk, Virginia.

porting justification and documentation. This includes coordinating and preparing NOAA budget submissions to the Department of Commerce, the Office of Management and Budget, and the Congress. These submissions include data on budget authority, obligations, outlays, permanent positions, and full-time-equivalent (FTE) employment.

Facilities Management

NFA oversees and manages 434 NOAA-owned, 2,229 NOAA-leased, and 121 General Services Administration (GSA)-controlled facilities throughout the United States and

its territories. It also coordinates the construction, renovation and alteration of new buildings using NOAA's own authority, and works with GSA for the construction of facilities under GSA's purview.

Grants and Cooperative Agreements

Every year NFA awards hundreds of millions of dollars in grants and cooperative agreements, and funds 30 Sea Grant Colleges and 11 Joint Institutes.

Homeland Security Strengthened

NFA contributed directly and substantively to NOAA's Homeland Security (HS) initiatives during FY 2002. Acquisitions and Grants acquired contract support services for the Critical Infrastructure and Assurance Office within DOC's Bureau of Industry and Security. Audit and Internal Controls and the NOAA Records Officer provided leadership for the vital records effort; facilities offices updated plans for evacuation of personnel; and NFA leaders and staff in Administrative Support Centers contributed to the development of Continuity of Operation Planning for facilities across the country. NFA staff conceptualized and initially developed the Quick-Look Matrix to make

NOAA's capabilities accessible to emergency planners up to the Federal level, enhancing NOAA's ability for quick response. Also, NFA developed a plan to ensure provision of support services to program functions identified as critical in NOAA's Continuity of Operation Planning and to disaster recovery at impacted sites. NFA developed models for tabletop exercises and training strategies, as well as a design for an NFA Emergency Operations Center. NFA staff developed corporate budgetary requirements for FY 2002; an FY 2003 emergency supplemental request; and the FY 2004 budget formulation process, targeting resources for investments in physical security, training, technology, and HS planning.

To advance emergency preparedness and NOAA's HS program, NFA has created a Security Division in the Environmental Compliance, Health, Safety and Security Office. This division is developing an NFA Business Continuity and Recovery Plan to assess capability and service needs and to reallocate resources nationwide. The plan is available for potential use in other NOAA organizations.

The Richard Bolling Federal Building in Kansas City, Missouri, is the home of NOAA's Central Administrative Support Center.



NOAA's Mountain Administrative Support Center is located in The David Skaggs Research Center in Boulder, Colorado.

Clean Financial Audit Achieved

NFA ensured that NOAA received its third consecutive clean financial audit. FY 2002 resource allocations were completed on time and with improved staffing efficiencies. Although NOAA's budget was larger and more complex, the cycle times were met with fewer staff and reduced overtime.

Personal Property Management and Administrative Services

NFA provides oversight, policy, and procedures for NOAA's Printing and Publications Program, for over \$4.5 billion of personal property, and for vehicle management and transportation services. NFA also provides information on mail management activities related to U.S. Postal Service regulations and postage costs, and is responsible for managing the appropriate mail funding for NOAA Line, staff, and program offices nationwide. NFA's Locator Service helps callers obtain the telephone numbers of NOAA's employees and major offices. NFA provides copier

management guidance throughout the country, and NFA's duplicating plant in the Silver Spring Metro Center complex offers a full range of duplicating services.

NOAA Warehouse Services

NFA manages a 65,000-square-foot warehouse in Capitol Heights, Maryland, which provides storage and moving services for NOAA, the Department of Commerce, and most of the Department's bureaus.

Environmental Compliance and Safety

NFA's Environmental Compliance and Safety (ECS) Division works to protect the environment in which employ-

Commerce Administrative Management System Implemented

Years of dedication and hard work culminated in October 2002 with the transition from the Financial Management System to the Commerce Administrative Management System (CAMS). Furthermore, a major data conversion effort was successfully executed on schedule at the same time NOAA was closing the books for FY 2002, which greatly increased the complexity of the effort.

In total 12 modules and 19 interfaces were implemented, making CAMS NOAA's accounting system of record. More than 900 program managers, budget, finance, and administrative staff and technical contacts were trained in using CAMS before its implementation date, and over 6,000 people have been trained nationwide since the CAMS effort was undertaken.

FUTURE OUTLOOK

NFA continues to face significant challenges in streamlining business processes and launching innovations, while ensuring sound management of its financial and administrative services. We will work to improve service delivery to support NOAA's scientific mission, as well as the Department of Commerce's strategic goals. We will continue to

focus on building on our achievements and on identifying and responding to our customers' needs and expectations. We will use innovative technologies and designs

to improve our current business practices. We will develop a highly skilled workforce to meet the needs of the 21st century.



NOAA's team of dedicated individuals was recognized for their outstanding implementation of the Commerce Administrative Management System. From left: Scott Gudes, Deputy Under Secretary; Jolene Lauria Sullens, Deputy CFO/Director of Budget; R.J. Dominic, Director of Finance/Comptroller; Sonya Stewart, Chief Financial Officer/Chief Administrative Officer; and James Taylor, DOC Deputy Chief Financial Officer/Director Financial Management. Photo: NOAA Finance and Administration

ees work and offers health and safety resources for NOAA employees. ECS's staff of qualified safety, industrial hygiene, environmental, and engineering professionals have experience in chemical and fire safety, environmental engineering, pollution prevention, hazardous waste disposal, and site remediation. They provide guidance on such issues as indoor air quality, worker protection, and accident prevention; establish NOAA-wide guidelines and procedures to implement Federal, state, and local statutes and regulations; develop NOAA-wide policies and procedures for environmental compliance and safety; and monitor compliance.

Construction Planning and Oversight

NFA supports NOAA's facilities planning efforts, providing guidance, oversight, and management of major construction projects and the Capital Improvements Program. This support includes developing processes and policies and coordinating with other related NFA facilities programs.

Transportation Subsidy

NFA provides oversight, policy, and procedures for NOAA's Transportation Subsidy Program. Approximately 2,000 NOAA employees are currently enrolled in the program, which has a budget of \$1 million.

Office of International Affairs

Building Global Alliances



*William J. Brennan, Ph.D.
Deputy Assistant Secretary
for International Affairs*

International affairs is one of NOAA's core capabilities, essential to the support of NOAA's overarching mission goals. For this reason, International Cooperation and Collaboration has been designated in NOAA's Strategic Plan as one of the agency's crosscutting priorities for the 21st century. Over the past year, Admiral Lautenbacher has met with leaders of ocean, climate, and space organizations from around the world to promote international cooperation and support for expanding

the present global system for observing and predicting weather and climate-related events.

To advance NOAA's mission, the Office of International Affairs provides policy advice and support with respect to negotiations, partnerships, and other NOAA international interests and activities. To enhance NOAA's international capabilities, Vice Admiral Lautenbacher has encouraged the establishment of an International Affairs Council that will be NOAA's focal point for international policy, activities, and important crosscutting topical areas. Through this Council, NOAA's international affairs will be managed using matrix management principles to ensure coordination, cooperation, and communication on international activities and to raise the visibility of NOAA's international activities and accomplishments.

ACCOMPLISHMENTS

U.S. Funding for Global Observations Announced

In June 2002, at the World Meteorological Organization Executive Council held in Geneva, Admiral Lautenbacher announced new U.S. funding for the Global Climate Observing System. The GCOS is an international effort to investigate global climate change processes and observations. The \$600,000 to be provided will help support the GCOS *Second Report on the Adequacy of the Global Climate Observing System*. The funds will come to GCOS from the Intergov-

ernmental Panel on Climate Change (IPCC), which assesses information relevant for the understanding of the risks of human-induced climate change. The GCOS funds are part of a total of \$2.7 million in State Department funding to the IPCC in FY 2002.

President Bush's Clear Skies and Global Climate Change Initiatives announced in February 2002 call

From left: Admiral Lautenbacher; Bill Brennan; Scott Rayder, Chief of Staff; Pete Allen, Exhibit Manager; Matthew Borgia, Office of Education and Sustainable Development; and Aurelia Miko, Office of Global Programs.

for the United States to provide funding for high-priority areas of climate change science over the next five years. The United States will also provide resources to build climate observation systems in developing countries and will encourage developed countries to match the U.S. commitment.

World Summit on Sustainable Development Held

In August 2002, leaders of international oceanic and atmospheric organizations attended the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa. Vice Admiral Lautenbacher provided remarks on the important link between global observations and sustainable development.

The global climate observing system is currently a loose configuration of ocean-based data buoys and space-based environmental satellites that monitor the atmosphere and



collect climate- prediction data. The existing system is used to predict climate events, such as El Niño, and allows for greater understanding of the Pacific Decadal Oscillation, the North Atlantic Oscillation, and the Indian Ocean Dipole. A more comprehensive observation network would improve basic understanding of climate change and would generate operational forecasts that would allow the nations of the world to set science-based policies that ensure their future health, safety, and economic stability.

Vice Admiral Lautenbacher noted the landmark achievement in international cooperation and implementation of a global observing system—the deployment of the 500th Argo float. The individual Argo floats are uniquely equipped robots that gather information on a global scale—a capability that no other system possesses. A mechanism housed in the autonomous unit affects its buoyancy, causing it to sink to more than 6,000 feet below the surface, where it drifts passively for 10 days. The buoyancy mechanism then triggers the unit to rise, measuring the temperature and salinity profiles. Once the unit surfaces, an antenna beams the information to satellites for relay to shore receivers. The



Panelists at the World Summit on Sustainable Development discuss global water quality and supply issues. From left, Dawn Martin; Veerle Vandeverde; James Mosely, Deputy Secretary of Agriculture; Admiral Lautenbacher; Jean-Michel Cousteau; and Ellen Pikitch.

international program has a goal of placing 3,000 Argo floats throughout the world's oceans by 2006. NOAA has been one of the chief proponents of implementing the ocean-sensing array.

Enhanced Cooperation on Ocean and Climate Science

In November 2002, Vice Admiral Lautenbacher met with senior leaders from New Zealand and Australia to discuss enhanced cooperation on ocean- and climate-related issues in the Southern Hemisphere. "The Southern Pacific and Indian oceans offer critical environmental and climate data that are important to addressing climate change and climate events in that region and beyond," Vice Admiral Lautenbacher said. "As regional leaders, New Zealand and Australia play a key role in building the science base necessary to make informed decisions on climate in this region."

During his visit to Wellington, New Zealand, Vice Admiral Lautenbacher met with senior officials to discuss cooperation on climate change science, ocean and fisheries policy, meteorology, and cooperation with nations in the region. In Australia, discussions were held in Melbourne, Canberra, and Townsville with sen-



Robert Kemp, Australia's Minister of Environment and Heritage, and Admiral Lautenbacher celebrate the deployment of the 500th Argo float.

ior officials on scientific cooperation on a global observing system, regional cooperation, and ocean and fisheries policies.



FINANCIAL AND PROGRAM PERFORMANCE



Budget Overview



*Jolene A. Lauria Sullens
Deputy Chief Financial
Officer/Director of Budget*

NOAA's FY 2002 budget authority was \$3.2 billion. These funds were directed toward fulfilling NOAA's statutory and legal obligations, as well as Congressional responsibilities. They provided for equipment, direct labor, and other expenses that support NOAA's mission. Over the last 10 years, NOAA's appropriated

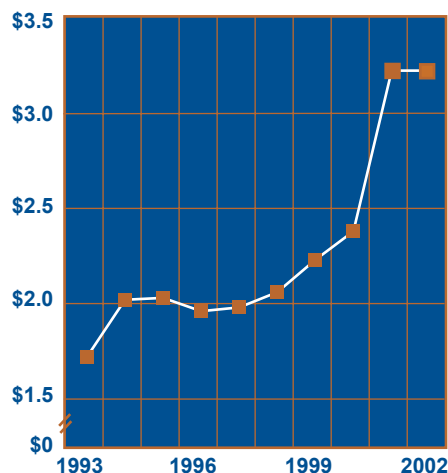
funding level has grown by 90 percent (Figure 1).

NOAA's budget is composed of several appropriations and special fund accounts. NOAA's two main appropriations are Operations, Research and Facilities (ORF) and Procurement, Acquisition and Construction (PAC). The ORF account funds core NOAA operations, such as advanced, short-term forecast and warning services; management of fisheries and protected species; and responsibilities for ensuring the health of coastal ecosystems. NOAA's PAC account was created in FY 1999 in response to requirements of the Federal Acquisition Streamlining Act of 1996. This account captures funding for multi-year capital projects and seeks advanced appropriations for projects that are in the acquisition stage. NOAA's other accounts, aggregated in the Non-ORF Total Budget Authority, include the Damage Assessment and Restoration Revolving Fund, the Coastal Zone Management Fund, and various fisheries funds.

RESOURCE HIGHLIGHTS

The FY 2002 Appropriations provided resources that allowed NOAA to reinvest in its workforce and supporting infrastructure. The total funding level for FY 2002 was a 4.7 percent increase of \$150 million over FY 2001. It provided increased resources for mapping and charting, climate research, the National Weather Service Telecommunications Gateway, satellite acquisitions, and ship modernization.

FIGURE 1
NOAA Budget Growth (in billions)



National Ocean Service

The National Ocean Service's (NOS') total FY 2002 enacted budget of \$514 was a net decrease of 14 percent, or \$83.4 million, from the previous fiscal year. The \$18 million increase for mapping and charting base programs supported the development and implementation of electronic navigational charts to provide real-time data to the Nation's marine transportation community. A level of funding of \$16 million for NOS' Coral Reef Program was appropriated to continue these efforts. Coastal zone management research was generously supported with an \$8.6 million increase over the previous year for grants. Congress showed strong support for NOS' Coastal and Estuarine Land Conservation Program, with a \$13.8 million increase over the FY 2001 appropriation. NOAA's National Marine Sanctuary construction efforts were supported with an \$11.8 million increase over FY 2001 funding.

National Marine Fisheries Service

NOAA Fisheries' budget has risen and fallen over the years. The FY 2002 enacted budget of \$811.5 million is a decrease of 0.5 percent from the FY 2001 budget of \$815.6 million. This decline was due in part to decreases

in fisheries management programs, marine mammal stranding, and fisheries habitat restoration. However, funding for enforcement and surveillance, sea turtles, and fisheries observers/training increased. NOAA Fisheries continued its Pacific salmon, vessel monitoring, and Endangered Species Act activities.

Office of Oceanic and Atmospheric Research

NOAA Research's FY 2002 enacted budget of \$383.7 million increased by a net \$33.2 million over FY 2001 funding. An additional \$16.4 million was provided for conducting climate research in the areas of atmospheric composition, climate variability, and the human impacts of climate change.

NOAA Research also received \$10.7 million over FY 2001 for weather and air quality research. Specifically, a demonstration project in New England was started to prototype an air quality forecast of aerosol and ozone concentrations, as well as to deliver real-time data for use in improving weather forecasting. NOAA's U.S. Weather Research Program received \$10.3 million for its long-range research efforts to improve forecasting of severe weather events and their disruptive effects on the public. Finally, \$8 million was provided for the Norman Consolidation Project (an additional \$8 million was also provided in the GSA appropriation for Norman).

NOAA Research also received \$17.6 million above FY 2001 funding for conducting research on the oceans, coastal areas, and the Great Lakes. Specifically, an additional \$14 million was provided for ocean exploration to dramatically increase the understanding of ocean systems and processes.

The National Sea Grant College Program received \$62.4 million for conducting research and education to tackle high-priority marine environmental problem areas identified collaboratively with Sea Grant partners and other constituent groups.

National Weather Service

The National Weather Service's budget has increased in past years since the implementation of major modernization efforts. The FY 2002 budget was \$742.7 million, a 7.2 percent increase over the FY 2001 budget of \$692.8 million. This increase was due in part to a marked increase in base funding, as well as to increases in funding for the Cooperative Observer Network, NEXRAD, and AWIPS operations and maintenance, and funds for a new National Weather Service Telecommunications Gateway.

National Environmental Satellite, Data and Information Service

The National Environmental Satellite, Data and Information Service's (NESDIS') FY 2002 enacted budget of \$704 million increased by \$64.0 million over the FY 2001 funding level. NESDIS was provided \$32.5 million to ensure the continuous operation of the NOAA and Department of Defense satellites used for monitoring the Earth's environment. The environmental data collected are used for providing early warning of major weather events, and for coastal monitoring and climate research.

NESDIS was provided \$0.75 million for commercial remote-sensing licensing activities. NESDIS is responsible for licensing space systems to ensure they are in compliance with national security, intelligence, and foreign policy needs.

NESDIS also received an increase of \$58.1 million for procurement of the geostationary and polar satellites. These observational platforms are the backbone for fulfilling NOAA's environmental monitoring and prediction mission requirements with respect to forecasting weather, conducting climate research, coastal monitoring, and search-and-rescue operations.

Program Support

In FY 2002, \$259.0 million was appropriated for NOAA's marine and aviation operations, corporate services, and facilities.

NOAA Marine and Aviation Operations. NOAA Marine and Aviation Operations (NMAO) received \$134.9 million in support of its mission. To allow for the centralized management of the NOAA fleet, \$63.8 million was permanently transferred to NMAO from the base budgets of the National Ocean Service, NOAA Fisheries, and NOAA Research to fund acquisition of data (days at sea). Funding totaling \$45.3 million in fleet replacement was provided to refurbish the *ADVENTUROUS* and *FAIR-WEATHER*, repair the *ALBATROSS IV* and *WHITING*, upgrade the *GORDON GUNTHER*, convert a T-AGOS vessel, and provide a SWATH vessel. Funding also provided for project management of the construction of NOAA's four fisheries survey vessels, conversion of a YTT vessel, and hydrographic equipment upgrades.

Corporate Services. NOAA received \$88.9 million in support of its corporate service activities. A net \$1.0 million decrease was primarily due to reduced requirements for the next phase of NOAA's new financial management systems, CAMS.

Facilities. Of the \$19.1 million appropriated for facilities, NOAA received \$13.7 million to support efforts to eliminate the facilities repair backlog; to provide needed additional operating funds for the new David Skaggs Research Center in Boulder, Colorado; and to continue restoration work on the Pribilof Islands in Alaska. An extensive environmental cleanup is required on the islands in preparation for the transfer of Federal lands to local communities.

ASSETS

The FY 2002 Consolidated Balance Sheet reflects total assets of \$6.6 billion (Table 1) and consists primarily of the following:

Fund Balance with Treasury

The Fund Balance with Treasury of \$2.4 billion consists primarily of appropriated funds to pay current liabilities and finance authorized purchase commitments (Figure 2).

Accounts Receivable, Net

Accounts receivable are established to receive payments for direct and indirect costs of services provided to another Federal agency (intragovernmental) or to a non-intragovernmental entity. Accounts Receivable, Net of \$73.6 million, consist of intragovernmental accounts receivable of \$34.8 million and non-intragovernmental accounts receivable of \$38.8 million (Figure 3). Outstanding billed and unbilled reimbursable services provided to other Federal agencies comprise the majority of NOAA's accounts receivable.

FIGURE 2
Fund Balance with Treasury (in millions)



FIGURE 3
Accounts Receivable, Net (in millions)

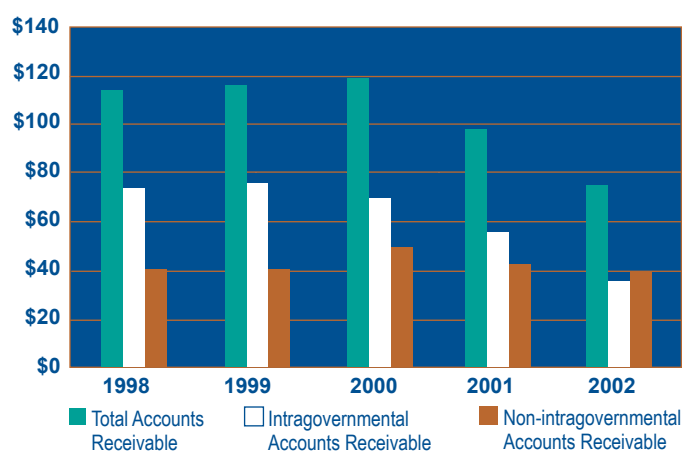


FIGURE 4
Loans Receivable and Related Foreclosed Property, Net (in millions)

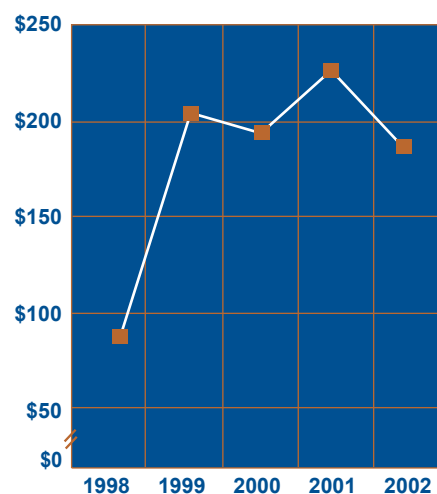


TABLE 1
Entity and Non-entity Assets (in thousands)

	FY 2002	FY 2001
Intragovernmental Assets	\$2,535,155	\$2,123,994
Fund Balance with Treasury	2,473,209	2,047,011
Accounts Receivable, Net	34,826	55,617
Investments in Treasury Securities, Net	—	1,799
Advances and Prepayments	27,120	19,567
Non-intragovernmental Assets	\$4,130,610	\$4,114,162
Cash and Other Monetary Assets	1,105	1,832
Accounts Receivable, Net	38,809	41,615
Loans Receivable and Related Foreclosed Property, Net	185,371	221,815
Inventory, Materials, and Supplies	72,232	79,419
General Property, Plant, and Equipment, Net	3,822,542	3,741,629
Advances and Prepayments	3,291	19,298
Other	7,260	8,554
TOTAL ASSETS	\$6,665,765	\$6,238,156

FIGURE 5
Inventory and Related Property (in millions)

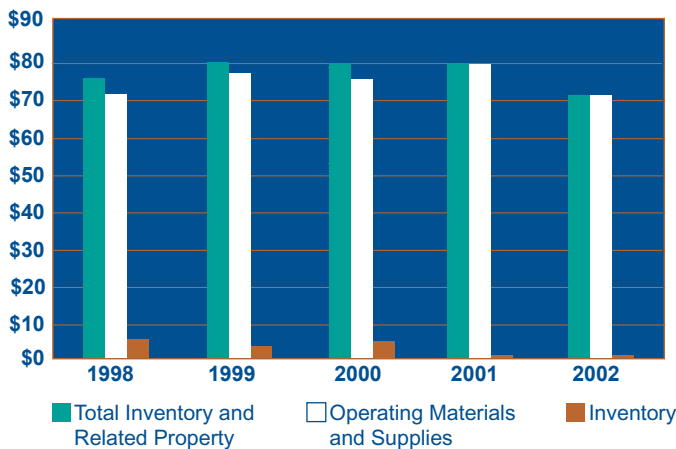


FIGURE 6
General Property, Plant, and Equipment (in millions)

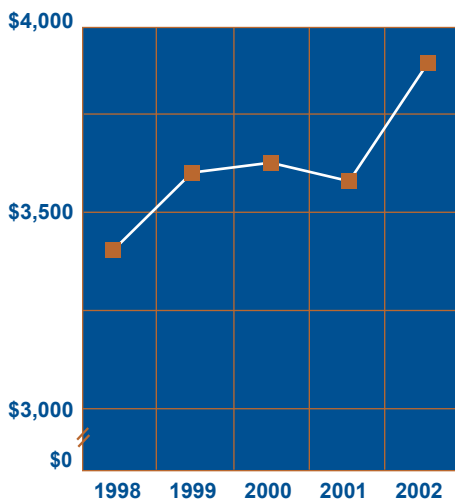
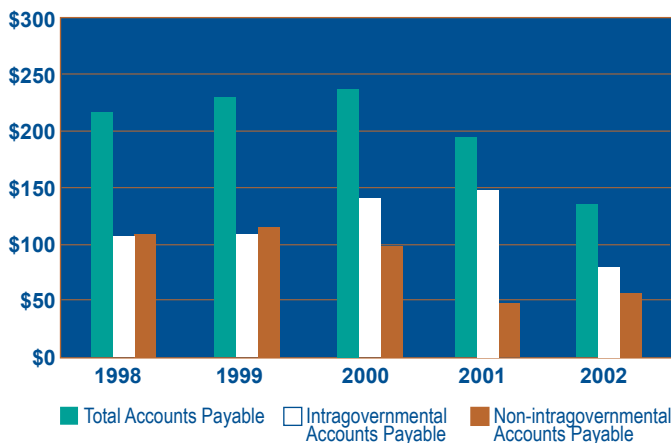


FIGURE 7
Accounts Payable, Net (in millions)



Loans Receivable and Related Foreclosed Property, Net

Loans Receivable and Related Foreclosed Property, Net of \$185.4 million consist of monies disbursed by the Fisheries Finance Program to private lenders for guaranteed loans in default, and monies disbursed as direct loans to finance various NOAA Fisheries loans totaling \$14.0 million and \$159.8 million, respectively (Figure 4). In addition, the Coastal Zone Management Fund disbursed \$11.6 million for direct loans.

Inventory and Related Property

Inventory and Related Property of \$72.2 million consist solely of operating materials and supplies—i.e., tangible personal property to be consumed in normal operations (Figure 5). The National Weather Service uses the majority of operating materials and supplies, which are located at NOAA's National Logistics Support Center. NOAA's inventory, comprised primarily of maps and charts, was transferred to the Federal Aviation Administration during FY 2001.

General Property, Plant, and Equipment

General Property, Plant, and Equipment (satellites, NEXRAD, AWIPS, ships, buildings, etc.) is stated at net book value of \$3.8 billion (Figure 6). It consists mainly of construction work in progress, satellites and weather systems, and structures and facilities with net book values of \$2.1 billion, \$1.4 billion, and \$0.3 billion, respectively. Satellite and launch services are generally procured under long-term, multi-satellite contracts, which provide for payments by NOAA over the contract periods.

Fluctuation Analysis

NOAA's total assets increased by approximately \$400 million from September 30, 2001, to September 30, 2002, as a result of a \$400 million increase in Fund Balance with Treasury. Because NOAA received an increase in "no-year" Budgetary Authority, the agency's carryover of funds into FY 2002 as Unexpended Appropriations supports the increase in Fund Balance with Treasury.

NOAA's book value of General Property, Plant, and Equipment increased by approximately \$243 million, due to a 7 percent net increase in acquisitions during FY 2002. NOAA's Loans Receivable decreased by approximately \$36 million due to collections of outstanding loans receivable by the Coastal Zone Management Fund and the Fund's not having the authority to issue new loans.

TABLE 2
Entity and Non-entity Liabilities (in thousands)

	FY 2002	FY 2001
Intragovernmental Liabilities	\$322,576	\$332,766
Accounts Payable	58,940	40,903
Debt to Treasury	183,313	195,933
Resources Payable to Treasury	14,725	14,413
Unearned Revenue	45,739	55,843
Other	19,859	25,674
Non-intragovernmental Liabilities	\$859,076	\$859,907
Accounts Payable	77,671	101,108
Accrued Payroll and Annual Leave	96,667	119,127
Actuarial FECA Liability	50,373	65,974
NOAA Corps Pension	316,200	301,100
NOAA Corps Retirement Health Benefits	136,577	110,200
Accrued Grants	33,213	43,557
Environmental and Disposal Liabilities	81,652	55,260
Capital Leases	23,810	28,966
Unearned Revenue	35,227	26,494
Other Liabilities	7,686	8,121
TOTAL LIABILITIES	\$1,181,652	\$1,192,673
Net Position	\$5,484,113	\$5,045,483
Unexpended Appropriations	2,044,578	1,634,805
Cumulative Results of Operations	3,439,535	3,410,679
TOTAL LIABILITIES & NET POSITION	\$6,665,765	\$6,238,156

LIABILITIES

The FY 2002 Consolidated Balance Sheet reflects NOAA liabilities totaling \$1.2 billion (Table 2). The following significant liabilities represent monies owed for goods and services that have been received but for which payment has not yet been made.

Accounts Payable

Accounts Payable of \$136.6 million consists of \$58.9 million of intragovernmental accounts payable and \$77.7 million of non-intragovernmental accounts payable (Figure 7).

Unearned Revenue

Unearned Revenue of \$81.0 million consists of intragovernmental and non-intragovernmental unearned revenue of \$45.8 million and \$35.2 million, respectively (Figure 8). The majority of NOAA's unearned revenue consists of amounts advanced to NOAA by other Federal entities, (such as the Federal Aviation Administration and the Department of Defense), and non-intragovernmental entities, for goods and services to be furnished. Unearned revenue decreased by 38 percent from FY 1998 to FY 2002, due to a greater prevalence of cost-reimbursable agreements relative to advance reimbursable agreements.

Future Funding Requirements

Future Funding Requirements of \$706.1 million represent liabilities not funded by budgetary resources (Figure 9).

FIGURE 8
Unearned Revenue (in millions)

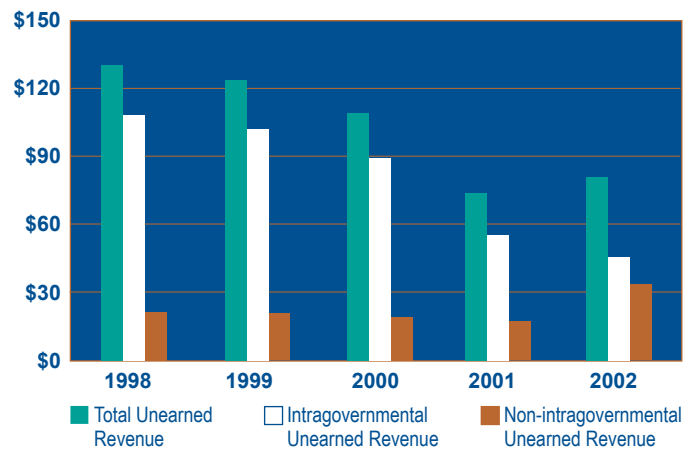


FIGURE 9
Future Funding Requirements (in millions)

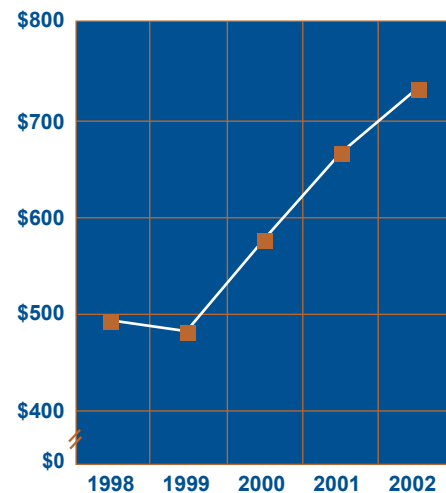
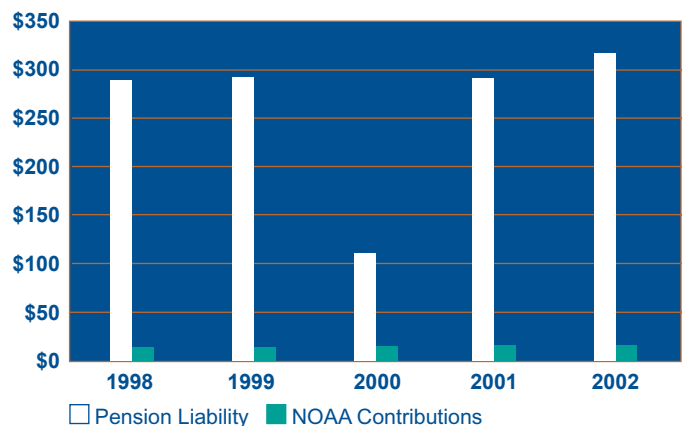


FIGURE 10
NOAA Corps Pension Liabilities (in millions)



They include NOAA Corps pension liabilities of \$316.2 million, NOAA Corps retirement health benefits of \$136.6 million, accrued leave balances of \$78.1 million, Federal Employee Compensation Act liabilities of \$60.2 million, environmental cleanup costs of \$75.8 million, capital lease liabilities of \$27.9 million, contingent liabilities of \$2.0 million, and other liabilities of \$9.3 million.

Liabilities not covered by budgetary resources result from the receipt of goods or services in the current or prior periods, or from the occurrence of eligible events in the current or prior periods, for which appropriations, revenues, or other sources of funds necessary to pay the liabilities have not been made available through Congressional appropriations or current NOAA earnings.

FIGURE 11
Appropriated Capital Used (in millions)

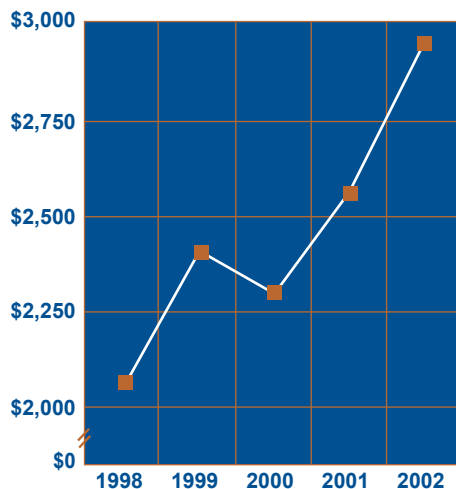
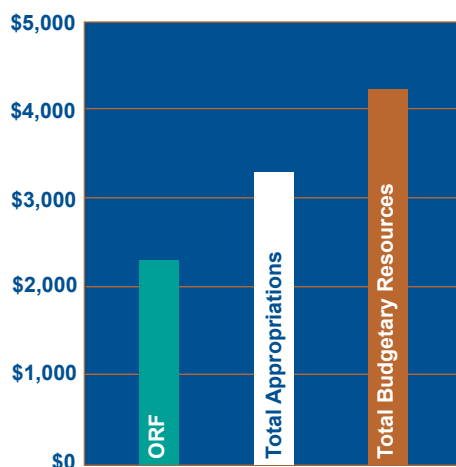


FIGURE 12
Budgetary Resources (in millions)



As of September 30, 2002, the total amount of liabilities classified as unfunded exceeded the \$470.3 million in available unobligated appropriations by \$235.8 million. These liabilities are presented as unfunded, rather than allocating portions of each of them to appropriated funds.

NOAA Corps Pension Liabilities

As previously mentioned, NOAA Corps Pension Liabilities represent non-intragovernmental liabilities not covered by budgetary resources relating to the NOAA Corps Retirement System (Figure 10). The NOAA Corps Retirement System is a noncontributory, defined benefit plan covering all active duty officers, retiree annuitants, and surviving families, totaling 604 as of September 30, 2002. During FY 2002, NOAA contributed \$13.9 million to the NOAA Corps Retirement System.

Fluctuation Analysis

Overall, NOAA's total liabilities remained constant between September 30, 2001, and September 30, 2002.

EQUITY

NOAA's Unexpended Appropriations increased by approximately \$400 million due to the fact that NOAA's overall Budgetary Authority increased in FY 2002 over FY 2001. The \$2.0 billion of unexpended appropriations consists of \$1.6 billion of outstanding undelivered orders and \$400 million of unobligated funds.

Appropriated Capital

Appropriated capital used represents revenue or a financing source to NOAA made available through Congressional appropriations. Appropriations are recognized as financing sources at the time the related expenses are incurred and the assets are consumed in operations (Figure 11).

Budgetary Resources

NOAA received approximately 78 percent, or \$3.3 billion, of its budgetary resources of \$4.2 billion through appropriations (Figure 12). Of the \$3.3 billion, NOAA's OR&F appropriation received \$2.3 billion. Other major sources of budgetary resources include unobligated balances carried over from FY 2001 and spending authority from offsetting collections, totaling \$457.6 million and \$284.7 million, respectively. Of the total budgetary resources of \$4.2 billion, \$3.8 billion was obligated during FY 2002.

Special Dedication

This Business Report is dedicated to the following deceased NOAA employees for their contributions, leadership, and commitment to making NOAA the world's premier scientific and environmental agency.

NATIONAL MARINE FISHERIES SERVICE

Mike E. Jaeggi, Maintenance Worker
James N. Lynk, IT Specialist
Douglas W. Prescott, IT Specialist (Database Management)

NOAA RESEARCH

Pamela J. Bergstedt, Secretary, Office Automation
Dr. Timothy L. Crawford, Division Director, Air Resources Laboratory
Patricia A. Fatimehin, Secretary, Office Automation

NATIONAL WEATHER SERVICE


Timothy D. Buckelew, Hydrologist
Danny L. Duncan, Electronic Technician
Ronald E. Ferguson, Supervisor Meteorology Technician
Kenneth R. Glodo, Supervisor Meteorology Technician
Mary L. Goessling, Administrative Support Assistant
Thaxson Patterson, Electronic Technician
Ralph E. Paxson, Electronic Technician
Johnny M. Roberts, Meteorology Technician
Dennis A. Rodgers, Meteorologist
Barbara J. Turner, Secretary, Office Automation
David J. Weinbrenner, Meteorologist

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE

James L. Donovan, Electronic Technician
Anthony E. Mason, Electronic Technician

NOAA MARINE AND AVIATION OPERATIONS

Eric S. Koss, Able Seaman
James Martin, Program Analyst
Juan C. Pradas Bergnes, Electronic Technician



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**National Weather Service
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**National Environmental Satellite, Data and Information Service
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**NOAA Marine and Aviation Operations
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